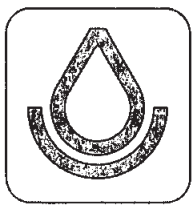
SOIL SURVEY OF

Rock Island County, Illinois



United States Department of Agriculture
Soil Conservation Service
in cooperation with
Illinois Agricultural Experiment Station

This is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and agencies of the States, usually the Agricultural Experiment Stations. In some surveys, other Federal and local agencies also contribute. The Soil Conservation Service has leadership for the Federal part of the National Cooperative Soil Survey.

Major fieldwork for this soil survey was completed in the period 1966–71. Soil names and descriptions were approved in 1972. Unless otherwise indicated, statements in the publication refer to conditions in the county in 1971. This survey was made cooperatively by the Soil Conservation Service and the Illinois Agricultural Experiment Station. It is part of the technical assistance furnished to the Rock Island County Soil and Water Conservation District.

 This soil survey is Illinois Agricultural Experiment Station Soil Report No. 97.

HOW TO USE THIS SOIL SURVEY

THIS SOIL SURVEY contains information that can be applied in managing farms and woodlands; in selecting sites for roads, ponds, recreation areas, buildings, and other structures; and in judging the suitability of tracts of land for farming, industry, and recreation.

Locating Soils

All the soils of Rock Island County are shown on the detailed map at the back of this publication. This map consists of many sheets made from aerial photographs. Each sheet is numbered to correspond with a number on the Index to Map Sheets.

On each sheet of the detailed map, soil areas are outlined and are identified by symbols. All areas marked with the same symbol are the same kind of soil. The soil symbol is inside the area if there is enough room; otherwise, it is outside and a pointer shows where the symbol belongs.

Finding and Using Information

The "Guide to Mapping Units" at the back of this survey can be used to find information. This guide lists all the soils of the county in numerical order by map symbol and gives the capability classification of each. It also shows the page for each mapping unit and capability unit and the woodland group, wildlife group, and recreation group to which the soil has been assigned.

Individual colored maps showing the relative suitability or degree of limitation of soils for many specific purposes can be developed by using the soil map and the information in the text. Translucent material can be used as an overlay over the soil map and colored to show soils that have the same limitation or suitability. For example, soils that have a slight limitation for a given use can be colored green, those with a moderate limitation can be colored yellow, and those with a severe limitation can be colored red.

Farmers and those who work with farmers can learn about use and management of the soils from the soil descriptions and from the discussions of the woodland groups.

Foresters and others can refer to the section "Woodland," where the soils of the county are grouped according to their suitability for trees.

Game managers, sportsmen, and others can find information about soils and wildlife in the section "Wildlife."

Community planners and others can read about soil properties that affect the choice of sites for recreation areas in the section "Recreation."

Engineers and builders can find, under "Engineering," tables that contain test data, estimates of soil properties, and information about soil features that affect engineering practices.

Scientists and others can read about how the soils formed and how they are classified in the section "Formation and Classification of the Soils."

Newcomers in Rock Island County may be especially interested in the section "General Soil Map," where broad patterns of soils are described. They may also be interested in the information about the county given at the beginning of the publication.

Contents

Issued October 1977

SOIL SURVEY OF ROCK ISLAND COUNTY, ILLINOIS

BY RICHARD REHNER, SOIL CONSERVATION SERVICE

FIELDWORK BY L. L. ACKER, R. D. BUSBY, L. A. DUNGAN, G. T. KELLER, R. REHNER, L. M. REINEBACH, J. A. THOMPSON, AND S. E. ZWICKER

UNITED STATES DEPARTMENT OF AGRICULTURE, SOIL CONSERVATION SERVICE, IN COOPERATION WITH ILLINOIS AGRICULTURAL EXPERIMENT STATION

ROCK ISLAND COUNTY is in the northwestern part of Illinois (fig. 1). It occupies 424 square miles and is bounded on the east by Whiteside and Henry Counties; on the south by Mercer County. The Mississippi River forms the western and northern boundary of Rock Island County and separates Rock Island County from Clinton, Scott, and Muscatine Counties in Iowa. The City of Rock Island is the county seat and is one of the major cities of the Quad-City complex.

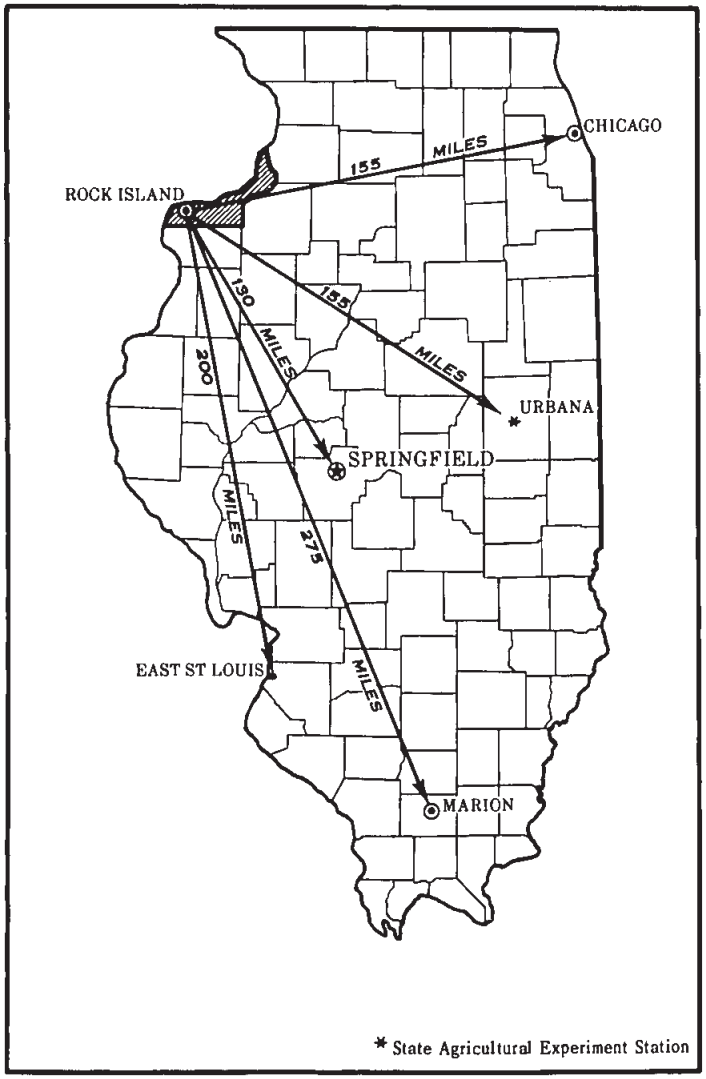


Figure 1.—**Location of Rock Island County in Illinois.**

General Nature of the County

This section describes the relief and climate of Rock Island County and gives some facts about settlement, industry, and farming.

Relief, Physiography, and Drainage[1]

Three main elements make up the topography of Rock Island County: upland plains, broad flood plains, and highly dissected valley sides. Although the county was covered by glaciers which greatly modified the preexisting landscape, the present topography is almost entirely the result of stream erosion. Thus the upland plains represent a gently rolling surface produced by glacial deposition, and the flood plains and dissected valley sides are the result of subsequent stream erosion.

The upland plains are at elevations of 750 to 790 feet between the Mississippi River and Copperas and Mill Creeks, are at about 800 feet south of Copperas and Mill Creeks, and are at about 700 feet in Coe Township at the northern end of the county. These areas are remnants of a once continuous glacial plain that extended far to the south and east (*5*).[2] Although largely of glacial origin, they are covered with 30 feet or more of wind-deposited loess. In most places the loess is simply a veneer without a topographic expression of its own, but in Coe Township it has been deposited in long, narrow ridges as much as 50 feet high that give the topography a distinct northwest-southeast orientation. Sand dunes are on uplands in the extreme western part of the county and in Coe Township.

The flood plains are chiefly along the Mississippi and Rock Rivers and on the Meredosia bottom lands. The flood plain elevations range from 540 feet at the southwestern end of the county to 610 feet on the sand plains in the northern part. Flood plains are the floors of the valleys cut by the streams. The lower areas are subject to periodic flooding. The flood plains are underlain by water-deposited sand, silt, and clay. They are relatively shallow over limestone and shale bedrock. In the extreme northern end of the county, however, bedrock is

[1] Prepared by DR. RICHARD C. ANDERSON, Department of Geology, Augustana College, Rock Island, Ill.

[2] Italic numbers in parentheses refer to Literature Cited, page 138.

at a depth of more than 100 feet. Sand and silt terraces are common on the flood plains.

Erosion by tributaries of the Mississippi and Rock Rivers has produced highly dissected topography adjacent to these main streams. In many places the local relief varies more than 200 feet. Steep slopes cause landslides and soil instability.

The Mississippi River serves as the water source for Rock Island, Moline, and East Moline, and the smaller towns and rural areas are supplied by wells pumping from creviced limestone at depths of 100 to 400 feet.

Climate[3]

Rock Island County has the continental climate typical of northern Illinois. Table 1 lists temperature and precipitation data for the county. The wide annual range of temperatures averages about 110° F, from summer maximums generally in the upper 90's to winter minimums of about 10 degrees below zero. Low pressure areas and the associated weather fronts bring frequent changes in temperature, humidity, cloudiness, and wind direction during much of the year.

Summers are warm, but hot periods are seldom prolonged. Cool air invasions from the north occur frequently enough, even in summer, to prevent the stagnation of hot, humid air masses. July is normally the warmest month. Temperatures of 100° F or higher have occurred during about one-third of the summers since 1931, but only once in the 13 years beginning in 1956. Summer days that reach 90° or higher average about 22 annually. The highest recorded temperature is the 107° on July 14, 1936. Eleven consecutive days that month had temperatures of more than 100°

[3] Prepared by WILLIAM L. DENMARK, climatologist for Illinois, Environmental Science Services Administration, National Weather Service, U.S. Department of Commerce.

January is normally the coldest month. February frequently has days as cold as January, but cold periods are usually of shorter duration. Temperatures of zero or lower have been recorded each winter since 1931, the average winter minimum being about —13°. The coldest recorded in this century was —26° on January 28, 1963. Temperatures of zero or lower occur on an average of 14 days each winter, generally during the three winter months. Below-zero temperatures have occurred as early as November and as late as March.

Annual precipitation averages about 33 inches, but has been as low as 20 inches and as high as 50 inches. About 1 year in 4 the annual precipitation is less than 29 inches, and it is more than 38 inches about equally as often. Winters are normally the driest part of the year. The monthly average precipitation is near 1½ inches for December to February. May and June, normally the wettest months, have a monthly average of near 4 inches. More than half the annual precipitation normally falls during the growing season of May to September.

Normal July and August rainfall alone is insufficient to meet the moisture demand of a vigorously growing field crop. Subsoil moisture must be stored during the previous fall to spring for best crop production during most seasons. Major droughts are infrequent. Rather prolonged dry periods during part of the growing season are not unusual and often reduce potential crop yields.

Most summer precipitation occurs in showers or thunderstorms of brief duration. A single thunderstorm often produces in excess of an inch of rain and is occasionally accompanied by hail or damaging wind. More than 6 inches of rain has fallen in 24 hours.

Growing field crops are most likely to be damaged if hail falls during the months of June, July, and August.

TABLE 1.—*Temperature and precipitation data*

[Based on records for the period 1931–70, at Moline, Ill. Elevation 582 feet]

Month	Temperature				Precipitation				
	Average daily maximum	Average daily minimum	Record maximum	Record minimum	Average total[1]	Maximum monthly	Minimum monthly	Average total snowfall and ice pellets	Average number of days with precipitation of 0.01 inch or more
	°F	°F	°F	°F	*Inches*	*Inches*	*Inches*	*Inches*	
January	32	14	63	—26	1.6	4.1	0.3	7.2	9
February	35	17	64	—16	1.3	2.8	.2	5.3	8
March	45	26	80	—19	2.4	5.3	.3	6.4	11
April	62	38	91	21	3.2	7.9	.7	.7	11
May	73	49	94	26	3.8	11.1	.6	(2)	12
June	83	60	98	41	4.4	8.2	1.0	0	10
July	88	63	100	47	3.3	11.4	1.0	0	9
August	87	61	106	44	3.5	9.3	.5	0	8
September	78	53	98	32	3.3	14.2	.5	(2)	9
October	67	42	92	19	2.5	9.4	0	.2	7
November	49	30	77	3	1.9	6.5	.3	1.5	7
December	35	18	69	—22	1.6	4.8	.2	6.7	9
Total					32.8			28.0	111

[1] All rainfall and melted snowfall. Normally, 10 inches of snow is the equivalent of 1 inch of water.
[2] Trace.

Thunderstorm days average about 45 annually, half of these during the critical growing period (*3*). Hail-producing thunderstorms in the same locality average two annually and less than one per year during the critical summer months. Not all hailstorms have stones of sufficient size or quantity to produce extensive crop damage.

Annual snowfall averages about 28 inches. Nearly 20 inches has fallen in a single month on several occasions. About 50 inches fell during the winter of 1925–26, with measurable snowfall every month from October to April.

The number of days between the average date of the last freezing temperature (32° or lower) in spring and the average date of the first such occurrence in fall has been termed the "growing season." This averages approximately 173 days in Rock Island County. The "growing season" designation is misleading as different crops have different temperatures at which growth is affected. Table 2 indicates the probability of several different threshold temperatures (*4*). Temperatures often vary considerably between ridge and valley locations during radiation freezes, the type most likely to damage crops in Illinois.

Settlement, Industry, and Farming[4]

Rock Island County was established in 1831. The first election of county officers was held in 1833. The county has an area of 424 square miles, or 271,488 acres. After settlement, the population steadily increased to 166,734 people in 1970. The center of the county is part of the metropolitan complex known as the Quad-Cities. This metropolitan area includes Davenport and Bettendorf in Iowa and Rock Island and Moline in Illinois. The area services slightly more than a third of a million people.

The county has a well-developed transportation system. Interstate Highway 74 and U.S. Highways 67, 6, and 150 bisect the county from north to south. Interstate Highways 80 and 280 cross the county from east to west. Several State roads cross the county, and the main secondary roads are blacktop. All of the rural area of the county is accessible by all-weather roads. Railroads furnish freight service to the county. In addition, railway passenger service to the Quad-City area is also available. Facilities for loading commodities onto river barges are available along the Mississippi River. The Quad-City Airport offers connections to all points throughout the United States.

The Quad-Cities is considered the "tractor capital of the world." In addition to small industries located in the Quad-Cities is the U.S. Army Weapons Command, Rock Island Arsenal on Arsenal Island. Several limestone quarries and gravel pits provide crushed rock for roads, finely ground material for limestone application on fields, and sand and gravel for building materials. Hybrid seed corn is produced in the northern part of the county. Cordova Township also has a large industrial complex. The Nuclear Generating Station in Cordova Township provides power for much of east-central Iowa and northwestern Illinois in addition to generating power for the Chicago metropolitan region.

The Quad-Cities offer many educational facilities. Augustana College and Blackhawk Junior College are located on the Illinois side of the Mississippi River. St. Ambrose College, Marycrest College, and Scott County Junior College are on the Iowa side of the river.

Farming has been a major enterprise in Rock Island County since its settlement. According to the 1969 Census of Agriculture there are 1,071 operating farms in Rock Island County and the average farm size is approximately 188 acres. About three-fourths of the farms have some livestock, and much of the grain produced is fed on the farm.

Corn, soybeans, and oats are the main crops. In 1969, the corn acreage was 68,286; soybean acreage was 14,904; and oats acreage was 10,449. In addition, some 10,386 acres were used to produce hay and 44,634 acres were used for pasture. Several large apple orchards exist in the county, and they have a total of 13,210 producing trees.

The total number of cattle in 1969 was 29,546, of which 1,978 were dairy cattle. During that same period, there were 102,418 swine, 6,250 sheep, and 53,730 hens and pullets of laying age.

How This Survey Was Made

Soil scientists made this survey to learn what kinds of soil are in Rock Island County, where they are located, and how they can be used. The soil scientists

[4] Prepared by EMIL E. KUBALEK, District conservationist, Soil Conservation Service, Moline, Ill.

TABLE 2.—*Probabilities of freezing temperatures in Rock Island County*[1]

Probability	32° F	28° F	24° F	20° F	16° F
Last in spring:					
Average date	April 23	April 12	March 31	March 21	March 16
25 percent chance after	May 2	April 21	April 9	March 30	March 23
10 percent chance after	May 10	April 29	April 17	April 7	April 2
First in fall:					
Average date	October 14	October 24	November 2	November 14	November 23
25 percent chance before	October 5	October 15	October 24	November 5	November 14
10 percent chance before	September 28	October 8	October 17	October 29	November 7

[1] All freeze data are based on 1931–60 records in a standard Weather Bureau thermometer shelter approximately 5 feet above the ground and in a representative exposure. Lower temperatures exist at times nearer the ground and in local areas subject to extreme air drainage.

went into the county knowing they likely would find many soils they had already seen and perhaps some they had not. They observed the steepness, length, and shape of slopes, the size and speed of streams, the kinds of native plants or crops, the kinds of rock, and many facts about the soils. They dug many holes to expose soil profiles. A profile is the sequence of natural layers, or horizons, in a soil; it extends from the surface down into the parent material that has not been changed much by leaching or by the action of plant roots.

The soil scientists made comparisons among the profiles they studied, and they compared these profiles with those in counties nearby and in places more distant. They classified and named the soils according to nationwide, uniform procedures. The *soil series* and the *soil phase* are the categories of soil classification most used in a local survey (*10*).

Soils that have profiles almost alike make up a soil series. Except for different texture in the surface layer, all the soils of one series have major horizons that are similar in thickness, arrangement, and other important characteristics. Most soil series are named for a town or other geographic feature near the place where a soil of that series was first observed and mapped. Muscatine and Tama, for example, are the names of two soil series. All the soils in the United States having the same series name are essentially alike in those characteristics that affect their behavior in the undisturbed landscape.

Soils of one series can differ in texture of the surface layer and in slope, stoniness, or some other characteristic that affects use of the soils by man. On the basis of such differences, a soil series is divided into phases. The name of a soil phase indicates a feature that affects management. For example, Fayette silt loam, 4 to 7 percent slopes, eroded, is one of the several phases within the Fayette series.

After a guide for classifying and naming the soils had been worked out, the soil scientists drew the boundaries of the individual soils on aerial photographs. These photographs show woodlands, buildings, field borders, trees, and other details that help in drawing boundaries accurately. The soil map in the back of this publication was prepared from the aerial photographs.

The areas shown on a soil map are called mapping units. On most maps detailed enough to be useful in planning the management of farms and fields, a mapping unit is nearly equivalent to a soil phase. It is not exactly equivalent, because it is not practical to show on such a map all the small, scattered bits of soil of some other kind that have been seen within an area that is dominantly of a recognized soil phase.

Some mapping units are made up of soils of different series, or of different phases within one series. Two such kinds of mapping units are shown on the soil map of Rock Island County, soil complexes and undifferentiated groups.

A soil complex consists of areas of two or more soils, so intermingled or so small in size that they cannot be shown separately on the soil map. Each area of a complex contains some of each of the two or more dominant soils, and the pattern and relative proportions are about the same in all areas. The name of a soil complex consists of the names of the dominant soils, joined by a hyphen. Sylvan-Bold silt loams, 18 to 60 percent slopes, is an example.

An undifferentiated group is made up of two or more soils that could be delineated individually but are shown as one unit because, for the purpose of the soil survey, there is little value in separating them. The pattern and proportion of soils are not uniform. An area shown on the map may be made up of only one of the dominant soils, or of two or more. The name of an undifferentiated group consists of the names of the dominant soils, generally joined by "and." Lament, Tell, and Bloomfield soils, 12 to 30 percent slopes, eroded, is an example.

In most areas surveyed there are places where the soil material is so rocky, so shallow, or so severely eroded that it cannot be classified by soil series. These places are shown on the map and are described in the survey, but they are called land types and are given descriptive names. Blown-out land is a land type in Rock Island County.

While a soil survey is in progress, samples of soils are taken, as needed, for laboratory measurements and for engineering tests. Laboratory data from the same kinds of soil in other places are assembled. Data on yields of crops under defined practices are assembled from farm records and from field or plot experiments on the same kinds of soil. Yields under defined management are estimated for all the soils.

But only part of a soil survey is done when the soils have been named, described, and delineated on the map and the laboratory data and yield data have been assembled. The mass of detailed information then needs to be organized in such a way as to be readily available to different groups of users, among them farmers, managers of woodland and range, and engineers.

On the basis of yield and practice tables and other data, the soil scientists set up trial groups. They test those groups by further study and by consultation with farmers, agronomists, engineers, and others, then adjust the groups according to the results of their studies and consultation. Thus, the groups that are finally evolved reflect up-to-date knowledge of the soils and their behavior under present methods of use and management.

General Soil Map

The general soil map at the back of this survey shows, in color, the soil associations in Rock Island County. A soil association is a landscape that has a distinctive proportional pattern of soils. It normally consists of one or more major soils and at least one minor soil, and it is named for the major soils. The soils in one association may occur in another, but in a different pattern.

A map showing soil associations is useful to people who want a general idea of the soils in a county, who want to compare different parts of a county, or who want to know the location of large tracts that are suitable for a certain kind of land use. Such a map is a useful general guide in managing a watershed, a wooded tract, or a wildlife area, or in planning engineering works, recreational facilities, and community develop-

ments. It is not a suitable map for planning the management of a farm or field, or for selecting the exact location of a road, building, or similar structure, because the soils in any one association ordinarily differ in slope, depth, stoniness, drainage, and other characteristics that affect their management.

The eight soil associations in Rock Island County are described on the following pages.

1. *Fayette-Sylvan-Hickory association*

Gently sloping to very steep, well drained and moderately well drained soils formed in loess or loamy glacial till; on uplands

This soil association is on gently sloping to strongly sloping convex ridgetops and strongly sloping to very steep valley sides. It makes up about 41 percent of the county. It is about 35 percent Fayette soils (fig. 2), 25 percent Sylvan soils, 10 percent Hickory soils, and 30 percent soils of minor extent.

The well-drained gently sloping to steep Fayette soils formed in loess. They are on convex ridgetops and valley sides. The ridgetops have slopes of 2 to 12 percent, and the valley sides slopes of 12 to 60 percent. The surface layer is mainly dark grayish-brown silt loam about 3 inches thick. The subsurface layer is dark grayish-brown to brown silt loam about 7 inches thick. The subsoil is silty clay loam about 50 inches thick. It is mainly dark yellowish brown and mottled in the lower part. The underlying material is dark yellowish-brown silt loam.

The well-drained, strongly sloping to very steep Sylvan soils are mainly on valley sides. They also formed in loess. The surface layer is very dark grayish-brown silt loam about 6 inches thick. The subsoil is silty clay loam about 24 inches thick. It is dark yellowish brown in the upper part and yellowish brown in the lower part. The underlying material is alkaline, yellowish-brown silt loam.

The moderately well drained to well drained, moderately steep to very steep Hickory soils are mainly on valley sides. They formed in till. The surface layer is grayish-brown silt loam about 3 inches thick. The subsurface layer is mainly yellowish-brown silt loam about 7 inches thick. The subsoil is about 38 inches thick. The upper 7 inches is mainly brownish-yellow silty clay loam. The next 10 inches is strong-brown silty clay loam over reddish-yellow clay. The lower 21 inches is brownish-yellow and olive-yellow clay loam. The underlying material is yellowish silt loam.

Minor soils in this association are the Downs, Rozetta, Stronghurst, Atterberry, and Orion soils. The well drained and moderately well drained, nearly level or gently sloping Downs and Rozetta soils are on ridgetops. In most places the somewhat poorly drained, nearly level Stronghurst and Atterberry soils are near

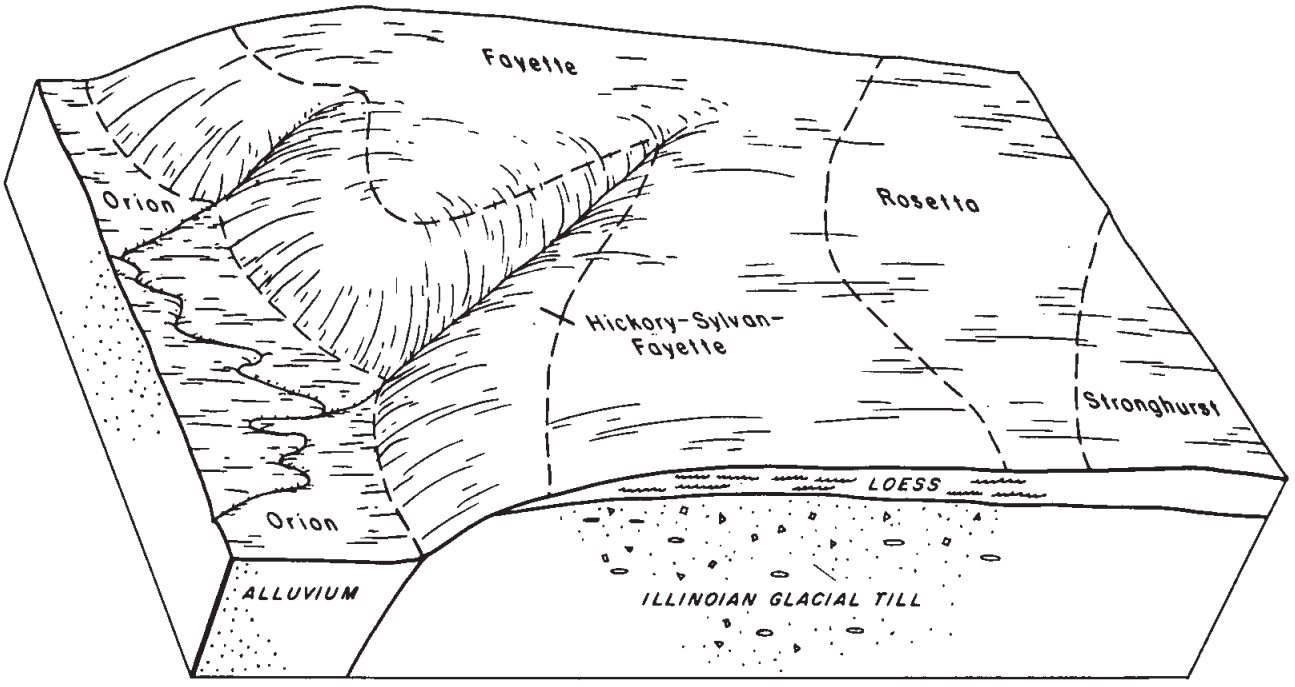


Figure 2.—**Pattern of soils and underlying material in the Fayette-Sylvan-Hickory association.**

the center of ridgetops. The somewhat poorly drained, nearly level Orion soils are on bottom lands. Also in this association are areas of Cut and fill land.

The nearly level to strongly sloping soils are used chiefly for cultivated crops and forage crops. Corn is the main crop, but soybeans, small grain, clover, and alfalfa are also grown. The moderately steep to very steep soils are used chiefly for pasture and woodland. Hogs and beef cattle are the main livestock. Erosion is the main concern in management.

Most of the urban area in the county is in this association.

2. *Muscatine-Tama association*

Nearly level to strongly sloping, somewhat poorly drained and well drained soils formed in loess; on uplands

This soil association is on nearly level to strongly sloping uplands. It makes up about 15 percent of the county. It is about 35 percent Muscatine soils (fig. 3), 30 percent Tama soils, and 35 percent soils of minor extent.

The somewhat poorly drained, nearly level Muscatine soils formed in loess. They are mainly on broad ridgetops. The surface layer is mostly very dark brown and black silt loam about 20 inches thick. The subsoil is about 37 inches thick. The upper 6 inches is brown to dark-brown silty clay loam, the next 23 inches is light brownish-gray silty clay loam, and the lower 8 inches is light-gray to gray heavy silt loam. The subsoil has yellowish-brown mottles throughout. The underlying material is gray silt loam that has yellowish-brown mottles.

The well-drained, nearly level to strongly sloping Tama soils formed in loess. They are mainly on ridgetops. The surface layer is mostly black silt loam about 20 inches thick. The subsoil is silty clay loam about 38 inches thick. The upper 20 inches is brown to dark brown, and the lower 18 inches is grayish brown and has yellowish-brown mottles. The underlying material is light brownish-gray light silty clay loam.

Minor soils in this association are the Sable, Denny, and Elkhart soils. The poorly drained, nearly level Sable soils are on broad ridgetops. The poorly drained Denny soils are in depressional areas on ridgetops. The well-drained, strongly sloping to moderately steep Elkhart soils are on valley sides.

The soils of this association are used chiefly for cultivated crops and forage crops. Corn and soybeans are the main crops, but small grain, clover, and alfalfa are also grown. Hogs and beef cattle are the main livestock. Erosion and drainage are the main concerns in management.

3. *Hickory-High Gap association*

Moderately steep to very steep, well drained and mod-

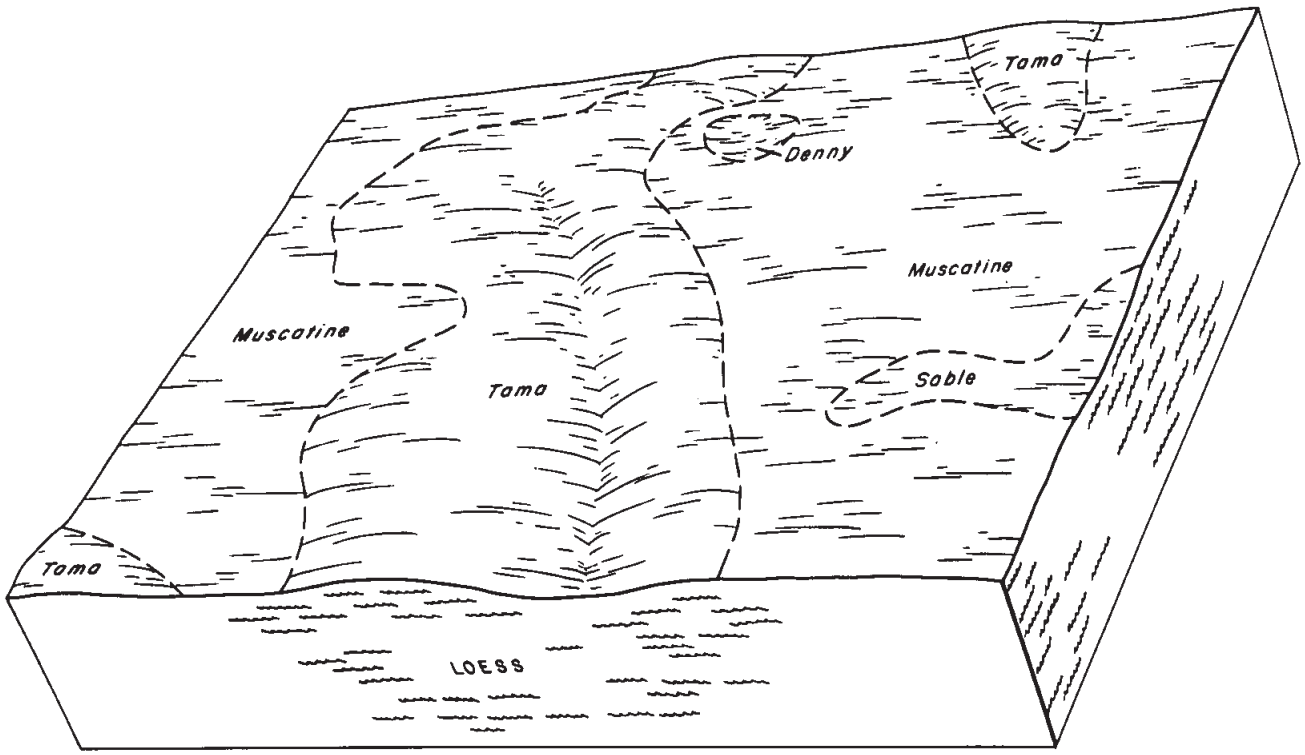


Figure 3.—Pattern of soils and underlying material in the Muscatine-Tama association.

erately well drained soils formed in loamy glacial till or in loamy glacial till and in the underlying weathered shale; on uplands

This soil association is on moderately steep to very steep valley sides. It makes up about 4 percent of the county. It is about 50 percent Hickory soils, 20 percent High Gap soils, and 30 percent soils of minor extent.

The moderately well drained to well drained, moderately steep to very steep Hickory soils formed in loamy till. They are mainly on valley sides. The surface layer is grayish-brown silt loam about 3 inches thick. The subsurface layer is light yellowish-brown and brownish-yellow silt loam about 7 inches thick. The subsoil is about 38 inches thick. The upper 7 inches is mainly brownish-yellow silty clay loam, the next 10 inches is strong-brown silty clay loam and reddish-brown clay, and the lower 21 inches is brownish-yellow and olive-yellow clay loam. The underlying material is mainly yellowish silt loam.

The well drained to moderately well drained, moderately steep to very steep High Gap soils formed in loamy glacial till and in underlying material weathered from shale. They are on valley sides. The surface layer is mixed grayish-brown and brown silt loam about 4 inches thick. The subsurface layer is pale-brown silt loam about 3 inches thick. The upper part of the subsoil is yellowish-brown silt loam about 6 inches thick, and the lower part is mainly yellowish-brown clay loam about 24 inches thick. Grayish silty clay shale is at a depth of 37 inches.

Minor soils in this association are the Sylvan and Fayette soils. The well-drained, moderately steep to very steep Sylvan and Fayette soils are on valley sides above Hickory and High Gap soils.

The soils of this association are used chiefly for pasture and woodland. Beef cattle is the main livestock. Erosion is the main concern in management.

4. *Seaton-Oakville-Lamont association*

Gently sloping to very steep, well-drained soils formed in loess or sandy material; on uplands

This soil association is on moderately sloping to steep dunes, gently sloping to moderately sloping convex ridgetops, and moderately sloping to very steep valley sides. It makes up about 2 percent of the county. It is about 30 percent Seaton soils, 25 percent Oakville soils, 10 percent Lamont soils, and 35 percent soils of minor extent.

The well-drained, gently sloping to steep Seaton soils formed in loess. They are mainly on convex ridgetops and valley sides. On ridgetops slopes are 2 to 7 percent, and on valley sides 4 to 30 percent. The surface layer is mainly dark grayish-brown silt loam about 8 inches thick. The subsurface layer is dark yellowish-brown silt loam about 2 inches thick. The subsoil is about 45 inches thick. The upper 37 inches is dark yellowish-brown silt loam, and the lower 8 inches is yellowish-brown silt loam mottled with gray. The underlying material is yellowish-brown silt mottled with gray.

The well-drained, moderately sloping to very steep Oakville soils formed in sandy deposits. They are on dunes and valley sides. On dunes slopes are 4 to 30 percent, and on valley sides 4 to 60 percent. The surface layer is dark grayish-brown and very dark grayish-brown loamy fine sand about 8 inches thick. The subsoil is yellowish-brown and dark yellowish-brown fine sand about 10 inches thick. The underlying material is yellowish-brown fine sand.

The well-drained, moderately sloping to steep Lamont soils formed in sandy deposits. They are mainly on dunes. The surface layer is very dark grayish-brown fine sandy loam about 4 inches thick. The subsurface layer is fine sandy loam about 7 inches thick. The upper part is very dark gray and brown, and the lower part is dark yellowish brown. The upper part of the subsoil is mainly fine sandy loam about 17 inches thick, and the lower part is yellowish-brown fine loamy sand about 10 inches thick. The underlying material is strong-brown fine sandy loam and stratified yellow sand.

Minor soils in this association are the Bloomfield, Chute, Strawn, and Tell soils. The excessively drained Bloomfield and Chute soils are on dunes or valley sides. In the western part of the county the moderately well drained to well drained, steep to very steep Strawn soils are on valley sides, and the well-drained Tell soils are on the associated dunes. In the northern part of the county, limestone bedrock crops out on some steeper slopes in this association.

The gently sloping to strongly sloping soils in this association are used chiefly for cultivated and forage crops. Corn is the main crop, but soybeans, small grain, clover, and alfalfa are also grown. The moderately steep to very steep soils are used chiefly for pasture or woodland. Hogs and beef cattle are the main livestock. Erosion and droughtiness are the main concerns in management.

5. *Seaton-Port Byron-Timula association*

Nearly level to steep, well drained and moderately well drained soils formed in loess; on uplands

This soil association is characterized by nearly level to strongly sloping convex ridgetops and strongly sloping to steep valley sides. It makes up about 5 percent of the county. It is about 50 percent Seaton soils, 30 percent Port Byron soils, 10 percent Timula soils, and 10 percent soils of minor extent.

The well-drained, gently sloping to steep Seaton soils formed in loess. They are mainly on convex ridgetops and valley sides. The ridgetops have slopes of 2 to 7 percent, and the valley sides have slopes of 4 to 30 percent. The surface layer is mostly dark grayish-brown silt loam about 8 inches thick. The subsurface layer is dark yellowish-brown silt loam about 2 inches thick. The subsoil is about 45 inches thick. The upper 37 inches is dark yellowish-brown silt loam, and the lower 8 inches is yellowish-brown silt loam mottled with gray. The underlying material is yellowish-brown silt mottled with gray.

The well drained and moderately well drained, nearly level to moderately sloping Port Byron soils formed in loess. They are mainly on ridgetops. The surface layer is silt loam about 16 inches thick. It is very dark gray in the upper part and mixed very dark grayish brown

and dark brown in the lower part. The subsoil is silt loam about 31 inches thick. The upper part is mixed dark brown and dark yellowish brown, and the lower part is dark brown and has brownish mottles. The underlying material is silt loam mottled with shades of brown.

The well-drained, strongly sloping to steep Timula soils formed in loess. They are mainly on valley sides. The surface layer is mainly dark grayish-brown silt loam about 7 inches thick. The subsoil is yellowish-brown silt loam about 13 inches thick. The underlying material is yellowish-brown, calcareous silt.

Minor in this association are the somewhat poorly drained, nearly level Joy soils on ridgetops. Limestone bedrock crops out on some steeper slopes along the northern edge of the association.

The nearly level to strongly sloping soils in this association are used chiefly for cultivated crops and forage crops. Corn is the main crop, but soybeans, small grain, clover, and alfalfa are also grown. The moderately steep to steep soils are used chiefly for pasture or woodland. Hogs and beef cattle are the main livestock. Erosion is the main concern in management.

6. *Sawmill-Coffeen-Mixed alluvial land association*

Nearly level, well drained to poorly drained soils formed mainly in silty material; on bottom lands

This soil association is on nearly level river bottom lands. It makes up about 21 percent of the county. It is about 15 percent Sawmill soils (fig. 4), 15 percent Coffeen soils, 10 percent Mixed alluvial land, and 60 percent soils of minor extent.

The poorly drained, nearly level Sawmill soils formed in silty alluvium. They are mainly on depressional bottom lands, The surface layer is about 32 inches thick. It is mainly black silty clay loam mottled with shades of brown. The subsoil is about 18 inches thick. It is gray silty clay loam mottled with strong brown and yellowish red. The underlying material is dark-gray silty clay loam mottled with olive and yellowish brown.

The somewhat poorly drained, nearly level Coffeen soils formed in silty alluvium. They are on bottom lands. The surface layer is silt loam about 19 inches thick. The upper part is black, and the lower part is very dark gray. The subsoil is silt loam about 25 inches thick. The upper part is dark grayish brown and has brownish and grayish mottles, and the lower part is light brownish gray and has dark-brown mottles. The underlying material to a depth of 49 inches is very pale brown sand. Below this, it is mottled grayish and brownish sandy clay loam.

The well-drained to poorly drained, nearly level Mixed alluvial land formed in silty and sandy alluvium. It is mainly on islands and outside of levees adjacent

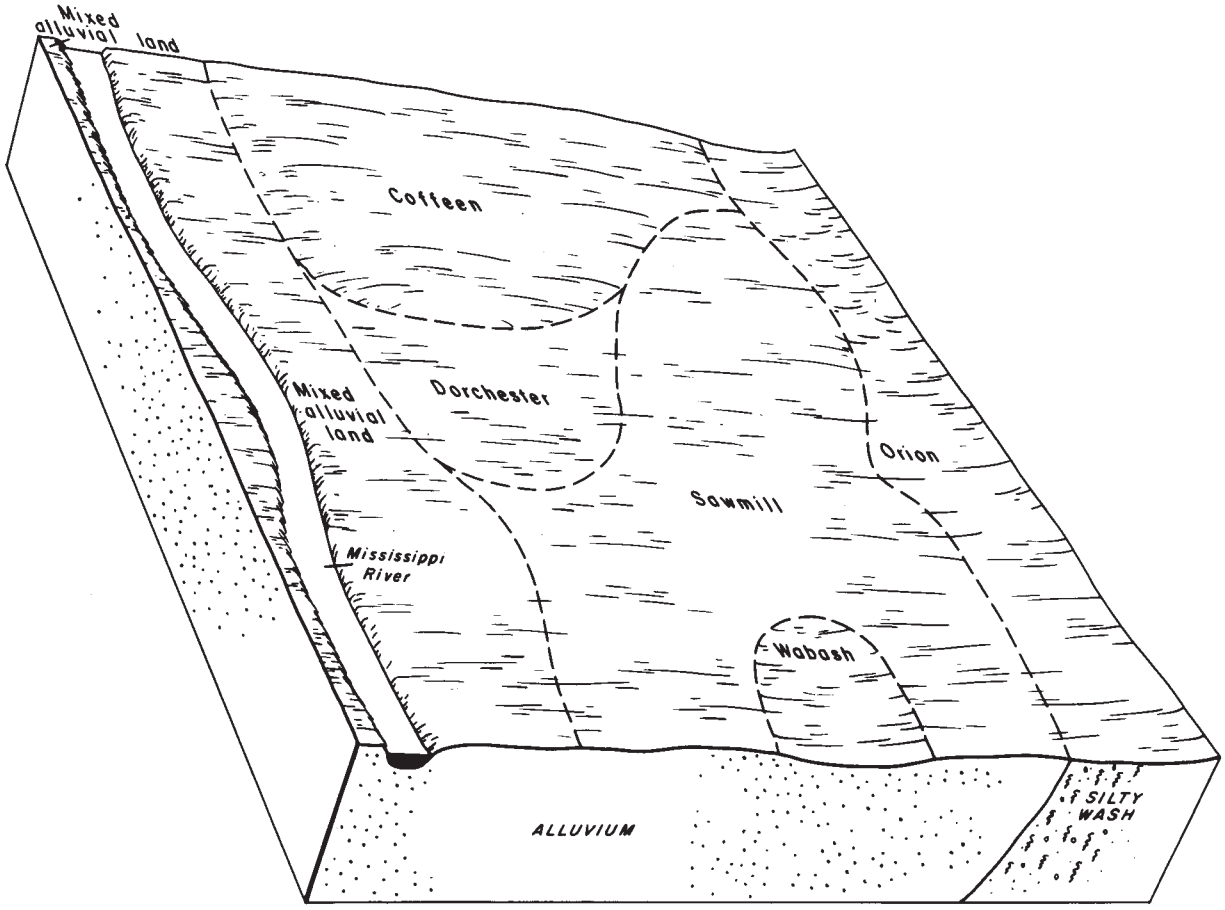


Figure 4.—**Pattern of soils and underlying material in the Sawmill-Coffeen-Mixed alluvial land association.**

and parallel to the Mississippi and Rock Rivers. This land type is made up of alluvial soils. It is about 35 percent Dorchester silt loam, about 15 percent Raddle silt loam, and 50 percent Coffeen silt loam, Lawson silt loam, Landes loamy fine sand, Millington silt loam, and Otter silt loam.

Minor soils in this association are the Orion, Wabash, Dorchester, Millsdale, Hitt shallow variant, and Lawler soils. The somewhat poorly drained Orion soils, very poorly drained Wabash soils, and moderately well drained Dorchester soils are nearly level and are on bottom lands. The poorly drained Millsdale soils and the somewhat poorly drained Lawler soils are nearly level and are on the more poorly drained terraces. The well-drained Hitt shallow variant soils are nearly level to gently sloping soils that are on the better drained terraces. Also in this association are areas occupied by the Mississippi River, Cut and fill land, and Marsh.

The soils of this association are used chiefly for cash grain crops. Corn and soybeans are the main crops, but small grains and some legume forages are also grown. Some areas near rivers and on islands are frequently flooded. These areas are impractical to protect from flooding and are best suited to wildlife habitat. Drainage is the main concern in management.

7. *Sparta-Dickinson-Coyne association*

Nearly level to strongly sloping, well drained to excessively drained soils formed mainly in sandy material; on terraces

This soil association is on nearly level to strongly sloping terraces. It makes up about 8 percent of the county. It is about 35 percent Sparta soils, 15 percent Dickinson soils, 15 percent Coyne soils, and 35 percent soils of minor extent.

The excessively drained, nearly level to moderately sloping Sparta soils formed in sandy deposits. They are mainly on tops and sides of terraces. The surface layer is mainly very dark grayish-brown sand about 28 inches thick. The subsoil is dark yellowish-brown sand about 8 inches thick. The underlying material is mainly yellowish-brown loose sand.

The well-drained to somewhat excessively drained, nearly level to strongly sloping Dickinson soils formed in sandy deposits. They are mainly on tops and sides of terraces. The surface layer is very dark gray and very dark grayish-brown sandy loam about 13 inches thick. The subsoil is about 22 inches thick. The upper part is mainly dark-brown sandy loam, and the lower part is mainly dark yellowish-brown loamy sand. The underlying material is mainly yellowish-brown loose sand.

The well-drained, nearly level to strongly sloping Coyne soils formed in sandy material and in the underlying reddish loamy deposits. They are mainly on tops and sides of terraces. The surface layer is mainly very dark gray fine sandy loam about 23 inches thick. The subsoil is about 32 inches thick. The upper 5 inches is mainly very dark grayish-brown and dark grayish-brown fine sandy loam, the next 14 inches is brown fine sandy loam, and the lower 13 inches is mainly reddish-brown silty clay loam. The underlying material is brown to dark-brown sand and fine gravel.

Minor soils in this association are the Niota, Canisteo, Saude, Burkhardt, and Waukee soils. Poorly drained, nearly level Niota and Canisteo soils are on the more poorly drained terraces. Well-drained, nearly level to gently sloping Waukee and Saude soils and somewhat excessively drained Burkhardt soils are on the better drained terraces.

The soils of this association are used chiefly for cultivated and forage crops. Corn and soybeans are the main crops, but small grains and alfalfa are also grown. Specialty crops can be grown if the soils are irrigated. Hogs and beef cattle are the main livestock. Droughtiness and erosion are the main concerns in management.

8. *Raddle-Joslin association*

Nearly level to moderately sloping, well drained and moderately well drained soils formed mainly in silty material; on terraces

This soil association is on nearly level to moderately sloping terraces. It makes up about 4 percent of the county. It is about 55 percent Raddle soils (fig. 5), 15 percent Joslin soils, and 30 percent soils of minor extent.

The moderately well drained and well drained, nearly level to moderately sloping Raddle soils formed in silty material. They are mainly on terraces. The surface layer is silt loam about 19 inches thick. The upper part is black, and the lower part is very dark gray. The subsoil is about 29 inches thick. The upper 7 inches is dark-brown silt loam, the next 16 inches is yellowish-brown silt loam, and the lower 6 inches is pale-brown silt loam mottled with yellowish brown. The underlying material is stratified layers of yellowish-brown loamy sand and grayish-brown silt loam mottled in shades of brown.

The well-drained, nearly level to moderately sloping Joslin soils formed in silty material and in the underlying reddish, clayey deposits. They are mainly on terraces. The surface layer is mainly black silt loam about 14 inches thick. The subsoil is about 46 inches thick. The upper 14 inches is mainly brown to dark-brown silt loam, the next 20 inches is yellowish-brown silt loam, and the lower 12 inches is reddish-brown silty clay. The underlying material is grayish-brown silt loam mottled in shades of brown and yellow.

Minor soils in this association are the well-drained Coyne, Trempealeau, and Martinsville soils. Nearly level to strongly sloping Coyne soils are on the sandier terraces. Nearly level to gently sloping Trempealeau soils are on terraces underlain by sand and gravel. Gently sloping to strongly sloping Martinsville soils are on terraces formed under timber vegetation. Also in this association are areas of Cut and fill land.

The soils of this association are used chiefly for cultivated crops. Corn and soybeans are the main crops, but small grain, clover, and alfalfa are also grown. Hogs and beef cattle are the main livestock. Erosion is the main concern in management.

Descriptions of the Soils

This section describes the soil series and mapping units in Rock Island County. Each soil series is described in considerable detail, and then, briefly, each mapping unit in that series. Unless it is specifically

mentioned otherwise, it is to be assumed that what is stated about the soil series holds true for the mapping units in that series. Thus, to get full information about any one mapping unit, it is necessary to read both the description of the mapping unit and the description of the soil series to which it belongs.

An important part of the description of each soil series is the soil profile, that is, the sequence of layers from the surface downward to rock or other underlying material. Each series contains two descriptions of this profile. The first is brief and in terms familiar to the layman. The second, detailed and in technical terms, is for scientists, engineers, and others who need to make thorough and precise studies of soils. Unless it is otherwise stated, the colors given in the descriptions are those of a moist soil.

As mentioned in the section "How This Survey Was Made," not all mapping units are of a soil series. Blown-out land, for example, does not belong to a soil series, but nevertheless, is listed in alphabetic order along with the soil series.

Following the name of each mapping unit is a symbol in parentheses. This symbol identifies the mapping unit on the detailed soil map. Listed at the end of each description of a mapping unit is the capability unit, woodland group, wildlife group, and recreation group to which the mapping unit has been assigned. The page for the description of each capability unit can be found by referring to the "Guide to Mapping Units" at the back of this survey.

The acreage and proportionate extent of each mapping unit are shown in table 3. Many of the terms used in describing soils can be found in the Glossary at the end of this survey, and more detailed information about the terminology and methods of soil mapping can be obtained from the Soil Survey Manual (*9*).

Atlas Series

The Atlas series consists of moderately steep to very steep, somewhat poorly drained soils on uplands. These soils formed partly in silty material and partly in the underlying buried soil. The native vegetation was hardwoods.

In a representative profile the surface layer is mainly dark-brown silt loam about 5 inches thick. The upper part of the subsoil is dark-brown and brown silty clay loam about 5 inches thick. The lower part is a buried soil about 59 inches thick. It is mainly grayish brown and is silty clay loam in the upper 10 inches and clay loam in the lower part.

Atlas soils are very slowly permeable and have high available water capacity. They are better suited to grasses, legumes, or trees than to other crops. Most slopes are too steep and too eroded to be suited to row crops.

Atlas soils in this county are mapped only in complexes with Hickory soils.

Representative profile of Atlas silt loam in an area of Hickory-Atlas complex, 18 to 30 percent slopes, severely eroded, at crest of east roadbank, 240 feet

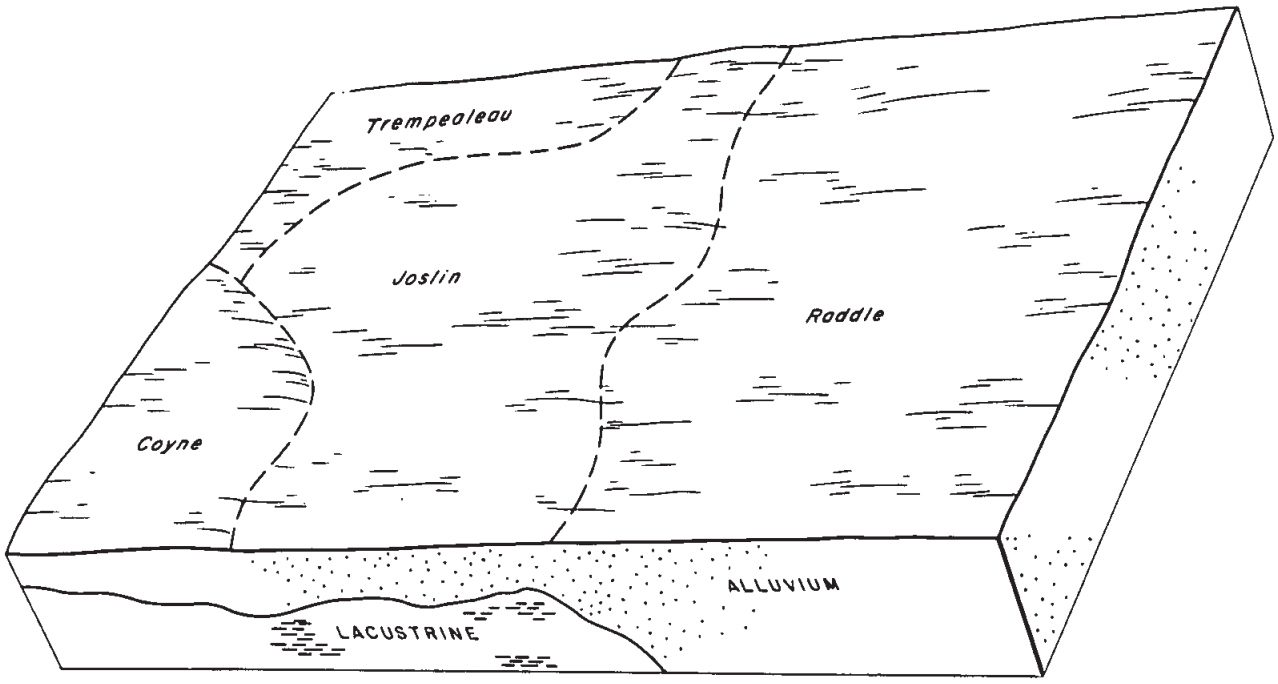


Figure 5.—**Pattern of soils and underlying material in the Raddle-Joslin association.**

TABLE 3.—*Approximate acreage and proportionate extent of the soils*

Soil	Area	Extent	Soil	Area	Extent
	Acres	*Percent*		*Acres*	*Percent*
Atterberry silt loam	2,850	1.0	Martinsville soils, 7 to 12 percent slopes, severely eroded	273	0.1
Blown-out land	413	.2	Martinsville soils, 12 to 18 percent slopes, severely eroded	436	.2
Borrow pit	300	.1	Millington silt loam	1,429	.5
Burkhardt-Saude complex, 0 to 4 percent slopes	721	.3	Millington silt loam, wet	211	.1
Calco silty clay loam	902	.3	Millsdale silty clay loam	578	.2
Calco silty clay loam, wet	389	.1	Mixed alluvial land	5,190	1.9
Canisteo silt loam	992	.4	Montgomery silty clay loam	870	.3
Clayey terrace escarpments	74	(1)	Muscatine silt loam	14,000	5.2
Coffeen silt loam	6,345	2.3	Niota silt loam	1,098	.4
Coyne fine sandy loam, 0 to 4 percent slopes	3,985	1.5	Oakville fine sand, 2 to 12 percent slopes	317	.1
Coyne fine sandy loam, 4 to 12 percent slopes	459	.2	Oakville fine sand, 12 to 60 percent slopes	360	.1
Cut and fill land	5,698	2.1	Orion silt loam	8,307	3.1
Denny silt loam	341	.1	Otter silt loam	2,364	.9
Dickinson sandy loam, 0 to 4 percent slopes	3,407	1.3	Otter silt loam, wet	1,015	.4
Dickinson sandy loam, 4 to 12 percent slopes	186	.1	Port Byron silt loam, 0 to 2 percent slopes	1,024	.4
Dorchester silt loam	1,754	.6	Port Byron silt loam, 2 to 6 percent slopes	4,098	1.5
Downs silt loam, 0 to 2 percent slopes	2,070	.8	Quarry	351	.1
Downs silt loam, 2 to 6 percent slopes	5,365	2.0	Raddle silt loam, 0 to 2 percent slopes	3,190	1.2
Elkhart silt loam, 7 to 12 percent slopes, eroded	1,211	.5	Raddle silt loam, 2 to 6 percent slopes	1,962	.7
Elkhart silt loam, 12 to 18 percent slopes, eroded	678	.3	Radford silt loam	4,070	1.5
Fayette silt loam, 2 to 6 percent slopes	26,108	9.6	Rozetta silt loam	5,012	1.8
Fayette silt loam, 4 to 7 percent slopes, eroded	2,865	1.1	Sable silty clay loam	1,502	.6
Fayette silt loam, 7 to 12 percent slopes, eroded	4,343	1.6	Saude loam	335	.1
Fayette soils, 7 to 12 percent slopes, severely eroded	970	.4	Sawmill silty clay loam	11,248	4.1
Gravelly terrace escarpments	55	(1)	Sawmill silty clay loam, wet	954	.4
Gravel pit	226	.1	Seaton silt loam, 2 to 6 percent slopes	687	.3
Hickory silt loam, 12 to 18 percent slopes, eroded	430	.2	Seaton silt loam, sandy substratum, 2 to 6 percent slopes	770	.3
Hickory silt loam, 18 to 30 percent slopes	3,183	1.2	Seaton silt loam, 4 to 7 percent slopes, eroded	1,815	.7
Hickory soils, 12 to 18 percent slopes, severely eroded	1,143	.4	Seaton silt loam, 7 to 12 percent slopes, eroded	1,664	.6
Hickory soils, 18 to 30 percent slopes, severely eroded	1,155	.4	Seaton silt loam, 12 to 18 percent slopes, eroded	951	.4
Hickory-Atlas complex, 12 to 18 percent slopes, severely eroded	1,630	.6	Seaton-Oakville complex, 7 to 12 percent slopes, eroded	367	.1
Hickory-Atlas complex, 18 to 30 percent slopes, severely eroded	1,558	.6	Seaton-Oakville complex, 12 to 18 percent slopes, eroded	522	.2
Hickory-High Gap silt loams, 12 to 18 percent slopes, eroded	563	.2	Seaton-Oakville complex, 18 to 30 percent slopes, eroded	529	.2
Hickory-High Gap silt loams, 18 to 30 percent slopes	2,262	.8	Seaton-Timula silt loams, 7 to 12 percent slopes, eroded	599	.2
Hickory-High Gap silt loams, 30 to 60 percent slopes	2,680	1.0	Seaton-Timula silt loams, 12 to 18 percent slopes, eroded	1,917	.7
Hickory-Sylvan-Fayette silt loams, 12 to 18 percent slopes, eroded	5,193	1.9	Seaton-Timula silt loams, 18 to 30 percent slopes, eroded	1,530	.6
Hickory-Sylvan-Fayette complex, 12 to 18 percent slopes, severely eroded	1,991	.7	Sparta sand, 0 to 6 percent slopes	7,487	2.8
Hickory-Sylvan-Fayette silt loams, 18 to 30 percent slopes	11,594	4.3	Strawn-Chute complex, 25 to 60 percent slopes	873	.3
Hickory-Sylvan complex, 18 to 30 percent slopes, severely eroded	1,836	.5	Stronghurst silt loam	2,677	1.0
Hickory-Sylvan silt loams, 30 to 60 percent slopes	7,949	2.9	Sylvan silt loam, 12 to 18 percent slopes	1,467	.5
Hitt loam, shallow variant, 0 to 4 percent slopes	521	.2	Sylvan silt loam, 18 to 30 percent slopes	4,190	1.5
Hoopeston sandy loam	350	.1	Sylvan soils, 7 to 12 percent slopes, severely eroded	2,473	.9
Joslin silt loam, 0 to 2 percent slopes	1,400	.5	Sylvan soils, 12 to 18 percent slopes, severely eroded	7,783	2.9
Joslin silt loam, 2 to 6 percent slopes	247	.1	Sylvan soils, 18 to 30 percent slopes, severely eroded	1,414	.5
Joy silt loam	509	.2	Sylvan-Bold silt loams, 18 to 60 percent slopes	1,380	.5
Lamont, Tell, and Bloomfield soils, 4 to 12 percent slopes, eroded	1,090	.4	Tama silt loam, 0 to 2 percent slopes	1,200	.4
Lamont, Tell, and Bloomfield soils, 12 to 30 percent slopes, eroded	226	.1	Tama silt loam, 2 to 6 percent slopes	7,035	2.6
Landes loamy fine sand	581	.2	Tama silt loam, 4 to 7 percent slopes, eroded	2,893	1.1
Lawler loam	547	.2	Tama silt loam, 7 to 12 percent slopes, eroded	2,053	.8
Lawson silt loam	4,813	1.8	Trempealeau silt loam, 0 to 4 percent slopes	340	.1
Marsh	1,290	.5	Velma silt loam, 12 to 18 percent slopes	652	.2
Martinsville silt loam, 2 to 7 percent slopes	649	.2	Velma-Coatsburg silt loams, 12 to 18 percent slopes, eroded	359	.1
			Wabash silty clay	932	.3
			Waukee loam, 0 to 4 percent slopes	1,571	.6
			Water	15,517	5.5
			Total	271,488	100.0

[1] Less than 0.1 percent.

north and 35 feet east of southwest corner of section; SW¼SW¼SW¼ sec. 33, T. 16 N., R. 2 W.

Ap—0 to 5 inches, dark-brown (10YR 3/3) silt loam, grayish brown (10YR 5/2) and brown (10YR 5/3) dry; moderate, very fine, granular structure; friable; neutral; clear, smooth boundary.

B21t—5 to 10 inches, dark-brown and brown (10YR 4/3) light silty clay loam, dark grayish brown (10YR 4/2) crushed; few, fine, distinct, yellowish-brown (10YR 5/8) mottles and few, fine, faint, dark yellowish-brown (10YR 4/4) mottles; thin, continuous, dark grayish-brown (10YR 4/2) clay films; moderate, fine, subangular blocky structure; friable; slightly acid; abrupt, smooth boundary.

IIB22tg—10 to 20 inches, dark grayish-brown (2.5Y 4/2) silty clay loam, very dark grayish brown (10YR 3/2) crushed; few, fine, faint, dark yellowish-brown (10YR 4/4) mottles; thin, continuous, very dark gray (10YR 3/1) clay films; moderate, fine, angular blocky structure parting to moderate, fine, granular; firm; medium acid, gradual, smooth boundary.

IIB23tg—20 to 25 inches, gray (10YR 5/1) heavy clay loam, dark grayish brown (10YR 4/2) crushed; few, very fine, distinct, dark yellowish-brown (10YR 4/4) mottles; thin, continuous, very dark gray (10YR 3/1) clay films; moderate, fine, granular structure; firm; many sand grains; medium acid; clear, smooth boundary.

IIB24tg—25 to 35 inches, grayish-brown (2.5Y 5/2) clay loam, grayish brown (2.5Y 5/2) crushed; few, fine, distinct, dark yellowish-brown (10YR 4/4) mottles; thin, continuous, dark-gray (10YR 4/1) clay films; moderate, fine, angular blocky structure; firm; many sand grains and some small gravel; strongly acid; gradual, smooth boundary.

IIB25tg—35 to 46 inches, gray (2.5Y 5/1) clay loam, grayish brown (2.5Y 5/2) crushed; common, medium, distinct, yellowish-brown (10YR 5/4) mottles; patchy, dark-gray (10YR 4/1) clay films on peds; moderate, fine, angular blocky structure; firm; some strong-brown (7.5YR 5/6) iron-manganese concretions; sand and many small stones; strongly acid; clear, smooth boundary.

IIB3tg—46 to 69 inches, light brownish-gray (2.5Y 6/2) clay loam, grayish brown (2.5Y 5/2) crushed; common, medium, distinct, yellowish-brown (10YR 5/4) and light olive-brown (2.5Y 5/6) mottles; patchy, dark-gray (10YR 4/1) clay films on peds; weak, angular blocky structure; firm; some strong-brown (7.5YR 5/6) iron concretions; sand and many small stones; medium acid; gradual, smooth boundary.

IIC—69 to 85 inches, light olive-brown (2.5Y 5/4) and yellowish-brown (10YR 5/6) clay loam, light olive brown (2.5Y 5/6) crushed; few, fine, prominent, yellowish-red (5YR 5/8) mottles; massive; abundant, black (5YR 2/1) iron-manganese concretions; sand and many small stones; medium acid.

The solum ranges from 48 to 72 inches in thickness. A loess cap as much as 20 inches thick is in some places. In undisturbed areas the A horizon ranges from silt loam to loam and is 5 to 10 inches thick. Most areas are disturbed and the A1 horizon and A2 horizon are mixed or destroyed. The Ap horizon is silt loam, silty clay loam, loam, or clay loam. The part of the B horizon that formed in loess is 5 to 15 inches thick and is silty clay loam. The underlying buried soil ranges from clay loam to light clay and is 40 to 60 inches thick.

Atlas soils are on uplands, as are Hickory and High Gap soils. They are more poorly drained and have more clay in the B horizon than Hickory soils. They are more poorly drained and do not have the underlying shale that is typical of High Gap soils.

Atterberry Series

The Atterberry series consists of somewhat poorly drained, nearly level soils that are mainly on uplands. These soils formed in deep loess under grass and timber vegetation.

In a representative profile the surface layer is black and dark-brown silt loam about 8 inches thick. The subsurface layer is dark-brown to brown silt loam about 5 inches thick. The subsoil is silty clay loam about 33 inches thick. The upper part of it is brown and grayish brown mottled with yellowish brown, and the lower part is light olive brown mottled with yellowish brown. The underlying material is light olive-brown to light olive-gray silt loam mottled with yellowish brown.

Atterberry soils are moderately to moderately slowly permeable and have very high available water capacity. They are suited to all crops commonly grown in the county.

Representative profile of Atterberry silt loam, 565 feet east of center of south 320 acres of section and 20 feet south in the northeast corner of the NW¼SW¼-SE¼ sec. 1, T. 16 N., R. 2 W.

Ap—0 to 8 inches, black (10YR 2/1) and dark-brown (10YR 4/3) silt loam; moderate, very fine and fine, granular structure; friable; mildly alkaline; abrupt, smooth boundary.

A2—8 to 13 inches, brown to dark-brown (10YR 4/3) silt loam; dark grayish-brown (10YR 4/2) organic coatings and white (10YR 8/1) uncoated silt grains on peds; weak, medium, platy structure parting to moderate, very fine, subangular blocky; friable; very dark gray (10YR 3/1) worm casts; few iron concretions; numerous fine pores; neutral; clear, smooth boundary.

B21t—13 to 21 inches, brown (10YR 5/3) silty clay loam; few, fine, distinct, yellowish-brown (10YR 5/6 and 10YR 5/8) mottles; thin, continuous, grayish-brown (10YR 5/2) clay films on peds; thin, patchy, dark grayish-brown (10YR 4/2) organic coatings on peds; moderate, fine, subangular blocky structure; friable; numerous fine pores; many fine iron-manganese concretions; few, white (10YR 8/1), uncoated silt grains; strongly acid; clear, smooth boundary.

B22t—21 to 28 inches, grayish-brown (2.5Y 5/2) and yellowish-brown (10YR 5/4) silty clay loam; few, fine, distinct, yellowish-brown (10YR 5/6 and 10YR 5/8) mottles and few, fine, faint, dark yellowish-brown (10YR 4/4) mottles; thin, continuous, grayish-brown (2.5Y 5/2) clay films on peds; moderate, medium, prismatic structure parting to moderate, medium, angular blocky; firm; few, white (10YR 8/1), uncoated silt grains; many fine iron-manganese concretions; many fine pores; strongly acid; gradual, smooth boundary.

B23tg—28 to 39 inches, light olive-brown (2.5Y 5/4) and light olive-gray (5Y 6/2) silty clay loam; common, medium, prominent, yellowish-brown (10YR 5/6 and 10YR 5/8) mottles; continuous, grayish-brown (2.5Y 5/2) and dark grayish-brown (10YR 4/2) clay films on vertical surfaces of peds; moderate, medium, prismatic structure; firm; many fine pores; many iron-manganese concretions; few, white (10YR 8/1), uncoated silt grains; very dark grayish-brown (10YR 3/2) worm casts; medium acid; clear, smooth boundary.

B3tg—39 to 46 inches, light olive-brown (2.5Y 5/4) and light olive-gray (5Y 6/2) silty clay loam, light olive brown (2.5Y 5/4) crushed; many, medium, prominent, yellowish-brown (10YR 5/6 and 10YR 5/8) mottles; discontinuous, grayish-brown (2.5Y 5/2) and dark grayish-brown (10YR 4/2) clay films on vertical surfaces of peds; moderate, coarse, prismatic structure; firm; many fine pores; many iron concretions; very dark grayish-brown (10YR

3/2) organic coatings in root channels; neutral; gradual, smooth boundary.

Cg—46 to 54 inches, light olive-brown (2.5Y 5/4) to light olive-gray (5Y 6/2) heavy silt loam; many, medium, prominent, yellowish-brown (10YR 5/6 and 10YR 5/8) mottles; massive; many iron concretions; many fine pores; very dark grayish-brown (10YR 3/2) organic coatings in root channels; moderately alkaline; slightly effervescent.

The solum ranges from 40 to 60 inches in thickness. The silt loam A1 or Ap horizon is 6 to 10 inches thick. The silt loam A2 horizon is 5 to 8 inches thick and ranges from dark grayish brown or grayish brown to brown. The silty clay loam B horizon ranges from 30 to 45 inches in thickness. The silt loam C horizon ranges from slightly acid to moderately alkaline.

Atterberry soils are in a soil pattern with Downs and Muscatine soils. They are more poorly drained than Downs soils. They have a thinner, dark-colored A horizon than Muscatine soils.

Atterberry silt loam (61).—In most places this nearly level soil is on ridgetops. Areas are irregularly shaped and are mainly away from the drainageways toward the center of the ridgetop. Most are less than 10 acres in size, but a few are more than 100 acres.

Included with this soil in mapping are a few areas of less productive, poorly drained Denny soils and areas of soils that are similar to Atterberry soils, but are poorly drained and remain wet for longer periods after rains than Atterberry soils. Almost all of these areas are indicated by a wet spot symbol on the soil map. Also included are a few areas at heads of drainageways where slopes are 3 to 4 percent and the soil is eroded in most places and needs to be stabilized.

Occasionally the water table is high. The organic-matter content is moderate.

This soil is used mainly for cultivated crops, but is suited to all crops commonly grown in the county. Capability unit I-2; woodland suitability group 3o1; wildlife group 4; recreation group 5.

Bloomfield Series

The Bloomfield series consists of somewhat excessively drained, moderately sloping to steep soils on uplands. These soils formed in sandy deposits under native timber vegetation.

In a representative profile the surface layer is fine sand about 4 inches thick. It is mainly very dark grayish brown. The subsurface layer is mainly yellowish-brown fine sand about 32 inches thick. Below this is a layer of yellowish-brown fine sand and thin bands of dark-brown loamy fine sand. This layer is about 9 inches thick. The next layer is brown loamy fine sand and strong-brown fine sand about 19 inches thick. The underlying material is brown and strong-brown fine sand.

Bloomfield soils are rapidly permeable and have low available water capacity. They are very droughty and are better suited to drought-resistant crops than to most other uses.

Bloomfield soils in this county are mapped only in undifferentiated groups with Lamont and Tell soils.

Representative profile of Bloomfield fine sand in an area of Lamont, Tell, and Bloomfield soils, 12 to 30 percent slopes, eroded, about 1,700 feet west of north-south road and about 1,650 feet south of Illinois Highway 92 in the southwest corner of NE¼SW¼NE¼ sec. 8, T. 16 N., R. 5 W.

Ap—0 to 4 inches, very dark grayish-brown (10YR 3/2) and some brown (10YR 4/3) fine sand; single grained; loose; neutral; clear, smooth boundary.

A21—4 to 8 inches, brown (10YR 4/3) and very dark grayish-brown (10YR 3/2) fine sand; single grained; loose; medium acid; clear, smooth boundary.

A22—8 to 36 inches, yellowish-brown (10YR 5/6) fine sand; single grained; loose; neutral; clear, smooth boundary.

A&B—36 to 45 inches, yellowish-brown (10YR 5/6) fine sand (A2); single grained; loose; lamellae of dark-brown (7.5YR 4/4) loamy fine sand (B2t); weak, coarse, subangular blocky structure; very friable; volume of A material and B material is about equal, lamellae are less than 1 inch thick; neutral; clear, smooth boundary.

B&A—45 to 64 inches, brown (7.5YR 5/4) loamy fine sand (B2t), and strong-brown (7.5YR 5/6) fine sand (A2); weak, coarse, subangular blocky structure; very friable; neutral; clear, smooth boundary.

C—64 to 80 inches, brown (7.5YR 5/4) and strong-brown (7.5YR 5/6) fine sand; single grained tending toward coarse, subangular blocky structure; very friable; neutral.

The solum ranges from 60 to 72 inches in thickness. The A horizon in undisturbed areas is mainly fine sand or loamy fine sand and ranges from 35 to 45 inches in thickness. In some undisturbed areas the A1 horizon is less than 6 inches thick and ranges from very dark gray (10YR 3/1) to very dark grayish brown (10YR 3/2). The A&B horizon is 25 to 35 inches thick. The sandier part of it ranges from fine sand to loamy fine sand. The lamellae range from fine sand to loamy fine sand and commonly are ½ inch to about 2 inches thick. They become thicker with increasing depth, and in some places, tend to merge into a composite layer. The C horizon ranges from fine sand to loamy fine sand and from slightly acid to neutral.

Bloomfield soils are associated with Lamont and Tell soils. They are sandier throughout the profile than Lamont or Tell soils. They are typified by alluvial bands, a characteristic not common to Lamont or Tell soils. Bloomfield soils do not have the silty A horizon and B horizon that are characteristic of Tell soils.

Blown-Out Land

Blown-out land (63) occurs as small dish-shaped areas that have been severely eroded by wind. The landscape appears pockmarked. Slopes range from 0 percent in the center of the blowout to 100 percent on its short sides. On the adjacent accumulated wind-deposited material, slopes are 0 to 6 percent. Blowouts that are less than 1 acre in size are indicated on the soil map by a blowout symbol. Some mapped areas are more than 10 acres in size.

Blown-out land is mostly yellowish-brown sand and dark-brown gravel. Commonly, the short sides of the blowout and the adjacent accumulated wind-deposited material are loose sand and the depressional part is gravel.

Further destruction is likely unless soil blowing can be controlled. Droughtiness is a severe hazard. Permeability is very rapid, and available water capacity is very low. The organic-matter content is very low.

Many blowouts have been abandoned and remain idle. Others are used for trash collection. Some have been reclaimed and are planted to evergreen trees. Capabil-

ity unit IVs-1; woodland suitability group 4s2; wildlife group 7; recreation group 2.

Bold Series

The Bold series consists of steep to very steep, well-drained soils on uplands. These soils formed in deep loess under native timber vegetation.

In a representative profile the surface layer is dark grayish-brown silt loam about 3 inches thick. It is moderately alkaline. The underlying material is yellowish-brown heavy silt and also is moderately alkaline.

Bold soils are moderately permeable and have high available water capacity. The high content of natural lime decreases the amount of available phosphate and potash. The soils are better suited to grasses and legumes or trees than to other crops. Most slopes are too steep to be suited to cultivated crops.

Bold soils in this county are mapped only in a complex with Sylvan soils.

Representative profile of Bold silt loam in an area of Sylvan-Bold silt loams, 18 to 60 percent slopes, on a prominently exposed bluff above northwest side of road in the southwest corner of SW¼NE¼NW¼ sec. 20, T. 18 N., R. 1 E.

A1—0 to 3 inches, dark grayish-brown (10YR 4/2) silt loam, light brownish gray (10YR 6/2) and pale brown (10YR 6/3) dry; moderate, medium, platy structure; friable; moderately alkaline; strongly effervescent; abrupt, smooth boundary.

C—3 to 60 inches, yellowish-brown (10YR 5/4) heavy silt, very pale brown (10YR 7/4) dry; massive; carbonate concretions in lower part; moderately alkaline; violently effervescent.

The A horizon is silt loam or silt and ranges from 2 to 10 inches in thickness. It is mildly alkaline or moderately alkaline. The C horizon is silt loam or silt and is highly calcareous.

Bold soils formed in thick loess as did Sylvan and Elkhart soils. They do not have the B horizon that is characteristic of Sylvan and Elkhart soils. They also have a lighter colored A horizon than Elkhart soils.

Borrow Pit

Borrow pit (B.P.) occurs where soil material has been mechanically removed. Most areas are rectangular or square in shape, but some are confined within irregular property lines. Many areas are small, but a few are more than 10 acres in size.

Borrow pit ranges widely in texture. In most areas the soil material is excavated to a depth of more than 4 feet, and the underlying material is exposed. The composition of the remaining soil material can be estimated by referring to characteristics of surrounding undisturbed soils shown on the soil map.

Fertility and organic-matter content are low. If areas are reclaimed and vegetated, fertilization based on soil test and texture of the material is necessary. Other management practices such as topdressing and irrigation are needed in some areas.

Some nearly level areas are covered with water. Others are idle or are used for trash collection. Borrow pit is not assigned to a capability unit or a woodland, wildlife, or recreation group.

Burkhardt Series

The Burkhardt series consists of nearly level to gently sloping, somewhat excessively drained soils on terraces. These soils formed in sandy deposits and are underlain by sand and gravel. The native vegetation was prairie grasses.

In a representative profile the surface layer is very dark gray and very dark grayish-brown sandy loam about 13 inches thick. The subsoil is about 11 inches thick. It is mainly dark brown but some is brown and dark yellowish brown. The upper part of it is sandy loam, and the lower part is gravelly loamy sand. The underlying material is mainly yellowish-brown and dark-brown medium and coarse sand and fine gravel.

Burkhardt soils are droughty. They are moderately rapidly to rapidly permeable and have low available water capacity. They are better suited to drought-resistant crops than to most others.

Representative profile of Burkhardt sandy loam in an area of Burkhardt-Saude complex, 0 to 4 percent slopes, 58 feet southwest of right-of-way marker on southeast side of Illinois Highway 84 in the northeast corner of SE¼SE¼SE¼ sec. 33, T. 21 N., R. 2 E.

A1—0 to 7 inches, very dark gray (10YR 3/1) and very dark grayish-brown (10YR 3/2) sandy loam; moderate, fine and medium, granular structure; very friable; medium acid; clear, smooth boundary.

A3—7 to 13 inches, very dark gray (10YR 3/1) and very dark grayish-brown (10YR 3/2) sandy loam; compound moderate, medium, subangular blocky structure and moderate, fine and medium, granular structure; very friable; medium acid; clear, smooth boundary.

B2—13 to 20 inches, dark-brown and brown (10YR 4/3) and some dark-brown (10YR 3/3) and very dark gray (10YR 3/1) sandy loam; moderate, medium and coarse, subangular blocky structure; very friable; medium acid; clear, smooth boundary.

B3—20 to 24 inches, brown and dark-brown (10YR 4/3) and some dark-brown (10YR 3/3) and dark yellowish-brown (10YR 4/4) gravelly loamy sand; weak, coarse, subangular blocky structure; very friable; medium acid; gradual, smooth boundary.

IIC—24 to 50 inches, yellowish-brown (10YR 5/4) and some dark-brown (10YR 3/3) medium and coarse sand and fine gravel; single grained; medium acid.

The solum ranges from 18 to 24 inches in thickness. The sandy loam A horizon is 10 to 15 inches thick. The B horizon ranges from 5 to 15 inches in thickness. The B2 horizon is sandy loam, and the B3 horizon ranges from sandy loam to loamy sand. The C horizon is mixed medium and coarse sand and 20 to 40 percent fine gravel. It is medium acid to slightly acid.

Burkhardt soils are on terraces, as are Saude and Dickinson soils. Burkhardt soils have more sand and a thinner solum than Saude soils. They have appreciably more gravel in the lower part of the B horizon and in the C horizon than Dickinson soils.

Burkhardt-Saude complex, 0 to 4 percent slopes (961A).—Most nearly level areas of this mapping unit are somewhat broad, are in no apparent pattern, and are irregularly shaped. In a few places the unit is on very short escarpments between soils at different elevations. It is about 50 percent Burkhardt sandy loam and about 50 percent Saude loam. The soils are in a random pattern in the landscape and alternate irregularly in the mapping unit. Most areas are less than 20 acres in size, but a few are more than 80 acres. These soils have

the profile described as representative of the Burkhardt and Saude series.

Included with these soils in mapping on the eastern part of Arsenal Island are soils similar to Burkhardt and Saude soils, but limestone bedrock is at a depth of about 3 feet and limits the use of this area.

Soil blowing is a hazard, and Burkhardt soils are more susceptible to soil blowing than Saude soils, because the surface layer of Burkhardt soils has more sand. Droughtiness is a hazard. The organic-matter content is moderate.

Most of the acreage is used for crops commonly grown in the county, but it is suited to specialty crops if irrigated. Capability unit IIIs-1; woodland suitability group 3s2; wildlife group 7; recreation group 2.

Calco Series

The Calco series consists of nearly level, poorly drained soils on bottom lands. These soils formed in calcareous alluvium.

In a representative profile the surface layer is about 29 inches thick. It is black and very dark gray silty clay loam that has many snail shell fragments. The subsoil is very dark gray silty clay loam, has many snail shell fragments, and is about 15 inches thick. The underlying material is stratified. The upper 10 inches of it is greenish-gray silty clay loam that has a few snail shell fragments, and the lower part is greenish-gray silt loam that has many snail shell fragments.

Calco soils are moderately slowly permeable and have very high available water capacity. The high content of lime is caused by snail shells. The soils are better suited to crops tolerant of a seasonally high water table and to the high content of lime than to most others.

Representative profile of Calco silty clay loam, 240 feet north of center of drainage ditch, in line with center of old U.S. Highway 150 and 158 feet east in the northwest corner of SW¼SW¼SE¼ sec. 21, T. 17 N., R. 1 E.

Ap—0 to 6 inches, black (10YR 2/1) silty clay loam; compact parting to moderate, fine and medium, subangular blocky structure; firm; a few snail shell fragments; moderately alkaline; slightly effervescent; clear, smooth boundary.

A12—6 to 19 inches, very dark gray (N 3/0) silty clay loam; few, fine, distinct, dark-brown (10YR 3/3) mottles; compact parting to moderate, medium and coarse, subangular blocky and blocky structure; firm; many snail shell fragments; moderately alkaline; slightly effervescent; clear, smooth boundary.

A13—19 to 29 inches, black (N 2/0) silty clay loam; weak, coarse, subangular blocky structure; firm; many snail shell fragments; moderately alkaline; violently effervescent; clear, smooth boundary.

Bg—29 to 44 inches, very dark gray (N 3/0) silty clay loam; weak, coarse, blocky structure; many snail shells; moderately alkaline; violently effervescent; clear, smooth boundary.

C11g—44 to 54 inches, greenish-gray (5GY 5/1) silty clay loam; common, fine, prominent, olive-brown (2.5Y 4/4) mottles; massive; few snail shell fragments; moderately alkaline; violently effervescent; clear, smooth boundary.

C12g—54 to 64 inches, greenish-gray (5GY 5/1) and some grayish-green (5G 5/2) silt loam; massive; many snail shell fragments; moderately alkaline; violently effervescent.

The solum ranges from 40 to 60 inches in thickness. It is slightly effervescent to very strongly effervescent. The A horizon is black to very dark gray and ranges from 24 to 36 inches in thickness. The gleyed silty clay loam B horizon ranges from 15 to 25 inches in thickness. The gleyed C horizon ranges from silty clay loam to silt loam and clay loam. It ranges from slightly effervescent to violently effervescent. The soil has snail shell fragments throughout in most places.

Calco soils are on bottom lands, as are Sawmill, Otter, and Millington soils. They have more natural lime than Sawmill and Otter soils. They have more clay and less sand than Millington soils.

Calco silty clay loam (400).—This nearly level soil is dominantly in areas adjacent and parallel to rivers or creeks. In most places it is at one of the lowest positions on the landscape. Most areas are somewhat long and narrow. Most are less than 10 acres in size, but a few are more than 30 acres. This soil has the profile described as representative of the series.

Included with this soil in mapping are small areas of Sawmill silty clay loam, Otter silt loam, and Millington silt loam. Sawmill and Otter soils are less alkaline than Calco soils and fertilizer requirements differ. Millington and Otter soils have less clay in the surface layer than Calco soils and are more easily worked.

Frequently the water table is high in this soil. Flooding is a hazard on unprotected bottom land. The organic-matter content is high. The high content of lime in this soil decreases the amount of available phosphorus.

This soil is used mostly for cultivated crops or pasture. It is better suited to crops tolerant of the seasonally high water table and the high lime content than to most others. Some areas have been converted to woodland. The degree of suitability for any use in areas subject to overflow depends on the frequency and duration of flooding. Capability unit IIw-2; woodland suitability group 2w5; wildlife group 6; recreation group 8.

Calco silty clay loam, wet (W400).—This nearly level soil is dominantly in depressions. Most areas are outside of levees adjacent and parallel to rivers or creeks, but a few are in long and narrow sloughs that lack natural drainage outlets. Most are less than 10 acres in size, but a few are more than 40 acres.

Included with this soil in mapping are minor, wet areas of Sawmill silty clay loam, Otter silt loam, and Millington silt loam. Sawmill and Otter soils are less alkaline than Calco soils, and fertility requirements differ. Millington and Otter soils have less clay in the surface layer than Calco soils and are more easily worked.

The water table is permanently high in this soil. Ponding is a hazard. The organic-matter content is high. The high content of lime in this soil decreases the amount of available phosphorus.

This soil is mostly idle, but some areas are used for permanent pasture or woodland. The degree of suitability for any use depends on the frequency and duration of ponding. Capability unit Vw; woodland suitability group 2w5; wildlife group 6; recreation group 8.

Canisteo Series

The Canisteo series consists of nearly level, poorly drained soils on terraces. These soils formed in glacial drift.

In a representative profile the surface layer is about 18 inches thick. It is mainly black silt loam and has common shell fragments. The subsoil is dark-gray and grayish-brown silt loam. It has common shell fragments and is about 18 inches thick. The underlying material is gray stratified loam and silt loam.

Canisteo soils are moderately permeable and have high available water capacity. The high content of lime is caused by shells. The soils are better suited to crops tolerant of the seasonally high water table and the high lime content than to most others.

Representative profile of Canisteo silt loam, 2,300 feet south and 71 feet east of northwest corner of sec. 32, T. 19 N., R. 3 E.

A1—0 to 14 inches, black (10YR 2/1) silt loam; visible sand; compact parting to moderate, fine and medium, granular structure; friable; common shell fragments; moderately alkaline; violently effervescent; clear, smooth boundary.

A3—14 to 18 inches, very dark gray (10YR 3/1) silt loam; visible sand; compact parting to moderate, very fine and fine, granular structure; friable; common shell fragments; moderately alkaline; violently effervescent; clear, smooth boundary.

B21g—18 to 25 inches, dark-gray (10YR 4/1) and grayish-brown (10YR 5/2) silt loam; visible sand; weak, fine, subangular blocky structure; friable; common shell fragments; moderately alkaline; violently effervescent; clear, smooth boundary.

B22g—25 to 36 inches, dark-gray (10YR 4/1) and grayish-brown (10YR 5/2) silt loam; visible sand; few, fine, distinct, yellowish-brown (10YR 5/4) and dark-brown (7.5YR 4/4) mottles; moderate, medium, prismatic structure parting to weak, medium, subangular blocky; friable; common shell fragments; moderately alkaline; strongly effervescent; clear, smooth boundary.

C11g—36 to 56 inches, gray (5Y 5/1) stratified loam and silt loam; common, fine, prominent, yellowish-brown (10YR 5/4) mottles; massive; few shell fragments; dark-gray (10YR 4/1) krotovina; moderately alkaline; slightly effervescent; abrupt, smooth boundary.

C12g—56 to 62 inches, gray (5Y 5/1), reddish-brown (5YR 4/4), and dark-brown (7.5YR 4/4) stratified loam and silt loam; massive; moderately alkaline.

The solum ranges from 30 to 50 inches in thickness. It ranges from slightly effervescent to violently effervescent, but the calcium carbonate equivalent averages less than 15 percent. The soil has snail shell fragments throughout in most places. The A horizon ranges from black to very dark gray. It ranges from 10 to 20 inches in thickness and is silt loam or loam. The gleyed B horizon ranges from silt loam to loam or light clay loam. It is 15 to 25 inches thick. The gleyed C horizon ranges from silt loam to loam. It is neutral to moderately alkaline.

Canisteo soils formed in calcareous material as did Calco and Millington soils. They have more sand than Calco soils. They are dark to a shallower depth than Millington soils.

Canisteo silt loam (347).—This nearly level soil is in areas that have no apparent pattern and are irregularly shaped. Most areas are less than 20 acres in size, but a few are more than 100 acres.

Included with this soil in mapping are a few small areas of Coffeen silt loam. Coffeen soils are less alkaline than Canisteo soils, and fertilizer requirements differ. Some less productive sandy areas that are about 1 acre in size are indicated on the soil map by a spot symbol. Also included are a few areas of very poorly drained soils that are about 1 acre in size and are indicated on the soil map by the symbol for wet spots.

Frequently the water table is high in this soil. The organic-matter content is moderate. The high content of lime decreases the amount of available phosphorus.

This soil is used mainly for cultivated crops. It is better suited to crops tolerant of the seasonally high water table and the high lime content than to most others. Capability unit IIw-1; woodland suitability group 2w3; wildlife group 6; recreation group 7.

Chute Series

The Chute series consists of steep to very steep, excessively drained soils on uplands. These soils formed in sand under native timber vegetation.

In a representative profile the surface layer is dark-brown and yellowish-brown fine sand about 3 inches thick. It is neutral. The subsoil also is neutral. It is yellowish-brown fine sand about 10 inches thick. The underlying material is pale-brown fine sand that is moderately alkaline and strongly effervescent.

Chute soils are rapidly permeable and have low available water capacity. The high content of natural lime in the soils decreases the amount of available phosphate and potash. The soils are better suited to plants resistant to drought and to the high lime content than to most others. Slopes are too steep to be suited to cultivated crops.

Chute soils in this county are mapped only in a complex with Strawn soils.

Representative profile of Chute fine sand in an area of Strawn-Chute complex, 25 to 60 percent slopes, 292 feet uphill along center of road from middle of road junction at bottom of hill and 42 feet north into woods in the southwest corner of SW¼SE¼NE¼ sec. 6, T. 16 N., R. 5 W.

A—0 to 3 inches, dark-brown (10YR 4/3) and yellowish-brown (10YR 5/4) fine sand; weak, very fine and fine, granular structure; very friable; neutral; clear, smooth boundary.

B—3 to 13 inches, yellowish-brown (10YR 5/4) fine sand; weak, medium and coarse, subangular blocky structure parting to weak, very fine and fine, granular; very friable; neutral; clear, smooth boundary.

C—13 to 50 inches, pale-brown (10YR 6/3) fine sand; single grained; few, medium, distinct, yellowish-brown (10YR 5/6) iron stains in old root channels; moderately alkaline; strongly effervescent.

The A horizon is loamy fine sand or fine sand and is 2 to 6 inches thick. It ranges from neutral to moderately alkaline. The B horizon, if present, is loamy fine sand or fine sand and is 5 to 10 inches thick. It ranges from neutral to moderately alkaline. The C horizon is loamy fine sand or fine sand and contains free carbonates.

The parent material of Chute soils is alkaline, as are those of Bold and Timula soils. Chute soils are sandier throughout the profile than Bold and Timula soils. They are less deeply leached than Timula soils.

Clayey Terrace Escarpments

Clayey terrace escarpments (577) occur as strongly sloping to steep, somewhat long and narrow breaks. Slopes are short and separate less sloping soils at different levels on terraces. Slopes range from 7 to 30 percent. Most areas of these escarpments are moderately well drained or well drained, but a few that receive seepage are not so well drained. Most are less than 10 acres in size.

Clayey terrace escarpments are mainly reddish sandy clay, silty clay, and clay. The surface layer ranges from dark colored to light colored.

Included in mapping are areas of reddish soils that are sandy throughout or range from sand to clay within a given profile. Permeability of these included soils ranges from rapid to slow. Available moisture capacity ranges from very low to high, depending on the content of clay in the soil.

The hazard of erosion is severe on unprotected slopes. Permeability is slow, and available water capacity is high. The organic-matter content is moderately low.

Most terrace escarpments are used for pasture and are well suited to this use. A few are cropped, wooded, or idle. Capability unit VIe-2; woodland suitability group 2r2; wildlife group 2; recreation group 4.

Coatsburg Series

The Coatsburg series consists of moderately steep, poorly drained soils on uplands. These soils formed partly in silty material and partly in the underlying buried soil. The native vegetation was prairie grasses.

In a representative profile the surface layer is mainly very dark gray heavy silt loam about 12 inches thick. The subsoil is about 60 inches thick. The upper 6 inches of it is dark-gray, very dark gray, and grayish-brown silty clay loam. The next 36 inches is silty clay. It is mainly grayish brown mottled with yellowish brown in the upper part and gray mottled with dark yellowish brown and yellowish brown in the lower part. The lower 18 inches is gray and olive-gray clay loam mottled with strong brown and yellowish brown.

Coatsburg soils are slowly to very slowly permeable and have high available water capacity. They are suited to all cultivated crops commonly grown if erosion is controlled. They are suited to grasses and legumes commonly grown in the county.

Coatsburg soils in this county are mapped only in a complex with Velma soils.

Representative profile of Coatsburg silt loam in an area of Velma-Coatsburg silt loams, 12 to 18 percent slopes, eroded, 481 feet north and 53 feet east of gate center in the northwest corner of NW¼SE¼SE¼ sec. 34, T. 16 N., R. 3 W.

Ap—0 to 6 inches, very dark gray (10YR 3/1) heavy silt loam; moderate, very fine to medium, granular structure; friable; some compaction plates; neutral; abrupt, smooth boundary.

A12—6 to 12 inches, very dark grayish-brown (10YR 3/2), very dark gray (10YR 3/1), and dark-brown (10YR 3/3) light silty clay loam; moderate, very fine to medium, granular structure; friable; medium acid; clear, smooth boundary.

B1—12 to 18 inches, dark-gray (10YR 4/1), very dark gray (10YR 3/1), and grayish-brown (10YR 5/2) silty clay loam; moderate, fine and medium, granular structure; firm; many visible sand grains; medium acid; clear, smooth boundary.

IIB21tg—18 to 30 inches, grayish-brown (2.5Y 5/2) and some very dark gray (10YR 3/1) and dark-gray (10YR 4/1) silty clay; few, fine, distinct, yellowish-brown (10YR 5/4) mottles; thin, discontinuous, grayish-brown (10YR 5/2) coatings on all peds; weak, medium, subangular blocky structure; firm; 4-inch band of very dark gray (10YR 3/1) and dark-gray (10YR 4/1) material at a depth of 26 inches; many visible sand grains and small pebbles; few iron-manganese concretions; few root channels; medium acid; abrupt, smooth boundary.

IIB22tg—30 to 54 inches, gray (5Y 5/1) light silty clay; common, medium, prominent, dark yellowish-brown (10YR 4/4) and yellowish-brown (10YR 5/6 and 10YR 5/8) mottles; thin, discontinuous, dark-gray (10YR 4/1) and grayish-brown (10YR 5/2) coatings on peds; weak, medium and coarse, subangular blocky structure; firm; bands and streaks of iron-manganese concretions at most 6-inch intervals (about same color as mottles but yellowish red (5Y 4/8) in places); many sand grains and gravel, gravel is as much as 50 millimeters in diameter in lower part; slightly acid; clear, smooth boundary.

IIB3tg—54 to 72 inches, gray (5Y 5/1) and olive-gray (5Y 5/2) clay loam; many, coarse, prominent, strong-brown (7.5 YR 5/6) and yellowish-brown (10YR 5/6) mottles; weak, coarse, subangular blocky structure; sand not as prominent as in IIB22tg horizon; many iron-manganese concretions; slightly acid.

The solum ranges from 48 to 72 inches in thickness. The loess cap is as much as 20 inches thick. The A horizon is 10 to 15 inches thick and ranges from very dark gray to dark brown. It commonly is silt loam, but is light silty clay loam, loam, and light clay loam in places. In places the upper part of the B horizon has a silty clay loam layer as much as 10 inches thick that formed in loess. The underlying buried soil is 40 to 60 inches thick. The upper 36 inches is commonly silty clay but ranges to clay loam and light clay. The lower 18 inches ranges from heavy clay loam to clay loam.

Coatsburg soils are on uplands, as are Velma and Atlas soils. They are more poorly drained and have more clay in the B horizon than Velma soils. They have a thicker and darker colored A horizon than Atlas soils.

Coffeen Series

The Coffeen series consists of somewhat poorly drained, nearly level soils on bottom lands. These soils formed in silty alluvium.

In a representative profile the surface layer is silt loam about 19 inches thick. The upper part is black, and the lower part is mainly very dark gray. The subsoil is silt loam about 25 inches thick. The upper part is dark-grayish brown and has brownish and grayish mottles, and the lower part is light brownish gray and has dark-brown mottles. The underlying material is very pale brown sand to a depth of 49 inches. Below this depth it is mottled grayish and brownish sandy clay loam.

Coffeen soils are moderately permeable and have very high available water capacity. They are suited to all crops commonly grown in the county.

Representative profile of Coffeen silt loam, 130 feet west and 1,315 feet north of the center of sec. 25, T. 16 N., R. 6 W.

Ap—0 to 5 inches, black (10YR 2/1) silt loam, dark gray (10YR 4/1) dry; weak, thick, platy structure parting to moderate, very fine and fine, granular; friable; few sand grains; medium acid; abrupt, smooth boundary.

A12—5 to 9 inches, black (10YR 2/1) silt loam, dark gray (10YR 4/1) dry; weak, thick, platy structure; friable; few sand grains; medium acid; abrupt, smooth boundary.

A13—9 to 13 inches, very dark gray (10YR 3/1) silt loam, dark grayish brown (10YR 4/2) dry; moderate, medium, subangular blocky structure, slight tendency to part to weak, medium, platy structure; friable; few sand grains; medium acid; clear, smooth boundary.

A3—13 to 19 inches, mixed very dark gray (10YR 3/1) and dark grayish-brown (10YR 4/2) silt loam and visible sand; weak, medium, prismatic structure parting to moderate, fine and medium, subangular blocky; friable; few very fine sand grains; medium acid; clear, smooth boundary.

B1—19 to 29 inches, dark grayish-brown (10YR 4/2) silt loam and sand grains; many, fine, faint, brown (10YR 5/3) and pale-brown (10YR 6/3) mottles and few, fine, faint, light-gray (10YR 7/1 and 10YR 7/2) mottles; weak, coarse, prismatic structure; friable; some very dark gray (10YR 3/1) and pale-brown (10YR 6/3) worm casts; few very fine sand grains; neutral; clear, smooth boundary.

B2—29 to 44 inches, light brownish-gray (10YR 6/2) silt loam; many, fine, distinct, dark-brown (10YR 4/3) mottles; weak, coarse, prismatic structure; friable; many root channels; neutral; abrupt, smooth boundary.

IIC1—44 to 49 inches, very pale brown (10YR 7/3) medium sand, white (10YR 8/2) dry, very pale brown (10YR 7/4) crushed; single grained; loose; few shells; neutral; abrupt, smooth boundary.

IIIC2—49 to 69 inches, mottled light-gray (10YR 6/1), pale-brown (10YR 6/3), white (10YR 8/2), and strong-brown (7.5YR 5/6) sandy clay loam; massive; black (5YR 2/1) root channel linings; common, medium iron-manganese stains ranging from dark yellowish brown (10YR 4/4) to dark reddish brown (5YR 2/2); slightly acid.

The A horizon ranges from 10 to 20 inches in thickness, from silt loam to loam, and from black to very dark gray. The B horizon is 20 to 30 inches thick and is silt loam or loam. The C horizon, in most places, is layers of silt loam stratified with silty clay loam, clay loam, loam, or sand. The soils range from medium acid to neutral throughout.

Coffeen soils are on bottom lands, as are Lawson and Radford soils. They have a thinner, dark-colored A horizon than Lawson soils. They do not have a dark-colored buried soil, which is common in Radford soils.

Coffeen silt loam (428).—This nearly level soil is in areas within broad flood plains. Areas are irregularly shaped and are in no apparent pattern. Most are less than 40 acres in size, but a few are more than 400 acres.

Included with this soil in mapping are some areas of poorly drained soils similar to Coffeen soils. Included are areas of soils underlain by sand that have better internal drainage and where the depth to a water table is more than in Coffeen soils. Less productive sandy areas, about 1 acre in size, are indicated on the soil map by a spot symbol. Also included are a few areas, less than 1 acre in size, where slopes are short and narrow. These areas are indicated on the soil map by the symbol for escarpments.

Occasionally, the water table is high in this soil. Flooding is a hazard on unprotected bottom lands. The organic-matter content is moderate.

These soils are used mainly for cultivated crops and are suited to this use. The degree of suitability for any use in areas subject to overflow depends on the frequency and duration of flooding. Capability unit I-3; woodland suitability group 2o4; wildlife group 5; recreation group 6.

Coyne Series

The Coyne series consists of well-drained, nearly level to strongly sloping soils on terraces. These soils formed in sandy material and in the underlying reddish loamy deposits. The native vegetation was prairie grass.

In a representative profile the surface layer is mainly very dark gray fine sandy loam about 23 inches thick. The subsoil is about 32 inches thick. The upper 5 inches is mainly very dark grayish-brown and dark grayish-brown fine sandy loam, the next 14 inches is brown and dark-brown fine sandy loam, and the lower 13 inches is mainly reddish-brown silty clay loam and loam. The underlying material is brown and dark-brown sand and fine gravel.

Coyne soils are moderately rapidly to moderately permeable and have moderate available water capacity. They are somewhat droughty, and are better suited to drought-resistant crops than to most other uses.

Representative profile of Coyne fine sandy loam, 0 to 4 percent slopes, 244 feet east of north-south road fence and 473 feet north of east-west fence, in the northwest corner of SW¼NW¼SE¼ sec. 10, T. 20 N., R. 2 E.

Ap—0 to 9 inches, very dark gray (10YR 3/1) fine sandy loam; weak, coarse, subangular blocky structure parting to moderate, very fine and fine, granular; very friable; slightly acid; clear, smooth boundary.

A12—9 to 13 inches, black (10YR 2/1) fine sandy loam; weak, coarse, subangular blocky structure parting to moderate, very fine and fine, granular; very friable; slightly acid; clear, smooth boundary.

A13—13 to 23 inches, very dark gray (10YR 3/1) and some very dark grayish-brown (10YR 3/2) fine sandy loam; weak, coarse, subangular blocky structure parting to moderate, very fine and fine, granular; very friable; slightly acid; clear, smooth boundary.

B11—23 to 28 inches, very dark grayish-brown (10YR 3/2), dark-brown (10YR 3/3), and dark grayish-brown (10YR 4/2) fine sandy loam; weak, coarse, subangular blocky structure parting to moderate, very fine and fine, granular; very friable; medium acid; clear, smooth boundary.

B12—28 to 42 inches, brown and dark-brown (7.5YR 4/4) fine sandy loam; weak, coarse, subangular blocky structure; very friable; few, fine, distinct, black (10YR 2/1) iron-manganese concretions; medium acid; clear, smooth boundary.

IIB21t—42 to 52 inches, reddish-brown (5YR 4/4) light silty clay loam; continuous, moderately thick, dark reddish-brown (5YR 3/3) clay films on faces of peds; strong, medium and coarse, subangular blocky structure; firm; medium acid; abrupt, smooth boundary.

IIB22t—52 to 55 inches, reddish-brown (5YR 4/4) loam; continuous, moderately thick, dark reddish-brown (5YR 3/3) clay films on faces of peds; strong, medium and coarse, subangular blocky structure; firm; medium acid; abrupt, smooth boundary.

IIIC—55 to 60 inches, brown and dark-brown (7.5YR 4/4) sand and fine gravel; single grained; medium acid.

The solum ranges from 48 to 72 inches in thickness. Depth from the surface to the reddish IIB horizon ranges from 40 to 60 inches. The A horizon ranges from fine sandy loam to loamy sand and is 10 to 24 inches thick. It ranges from very dark gray to dark brown and black. The upper part of the B horizon ranges from light sandy loam to light loam. The reddish IIB horizon is 6 to 18 inches thick. It is loam, silt loam, clay loam, or silty clay loam. The IIC horizon is commonly sand and fine gravel, but in some places it is stratified silt loam, silty clay loam, loam, or clay loam. It is medium acid to neutral.

Coyne soils are on terraces, as are Dickinson and Joslin soils. They have a reddish IIB horizon, and Dickinson soils do not. They have more sand in the A horizon and B horizon and less clay in the IIB horizon than Joslin soils.

Coyne fine sandy loam, 0 to 4 percent slopes (764A). —This soil is in areas that are in no apparent pattern and are irregularly shaped. Most are less than 20 acres in size, but a few are more than 40 acres. This soil has the profile described as representative of the series.

Included with this soil in mapping are small areas of droughtier, less productive Dickinson and Sparta soils; soils similar to Coyne fine sandy loam that are less droughty and have reddish loamy deposits at a depth ranging from 24 to 40 inches; and soils similar to Coyne fine sandy loam that have a surface layer low to very low in content of organic matter. Included are soils that are less sandy, have more clay in the surface layer and upper part of the subsoil, have higher available water capacity, and are more productive. Outcrops of shale or sandstone are indicated on the soil map by the symbol for rock outcrop. Also included are soils similar to Coyne soils that have more clay in the reddish underlying deposit. Engineering interpretations for this deposit are the same as those for the reddish underlying layer of Joslin soils.

This soil is subject to soil blowing in unprotected areas. Droughtiness is a hazard. The organic-matter content is moderate.

This soil is used mainly for cultivated crops commonly grown in the county, but is well suited to specialty crops if irrigated. Capability unit IIs-2; woodland suitability group 3s2; wildlife group 1; recreation group 1.

Coyne fine sandy loam, 4 to 12 percent slopes (764C). —In most places this soil is on sides of ridges. In places areas are elongated in the shape of terraces. Most are less than 5 acres in size, but a few are more than 10 acres. This soil has a profile similar to the one described as representative of the series, but the dark-colored surface layer is somewhat thinner.

Included with this soil in mapping are small areas of droughtier, less productive Dickinson and Sparta soils and soils similar to Coyne fine sandy loam that have reddish loamy deposits at a depth of 24 to 40 inches. Included are soils that are less sandy, have more clay in the surface layer and upper part of the subsoil, have higher available water capacity, and are more productive. Some areas, about an acre in size, where slopes are short and narrow are indicated on the soil map by the symbol for escarpments. Also included are soils similar to Coyne soils that have more clay in the reddish underlying deposit. Engineering interpretations for this deposit are the same as for the reddish underlying layer of Joslin soils.

This Coyne soil is subject to water erosion and soil blowing if slopes are improperly managed. Droughtiness is a hazard. The organic-matter content is moderate.

This soil is used mainly for all cultivated crops commonly grown, but is suited to specialty crops if erosion is controlled and the supply of water is adequate. Capability unit IIIe–2; woodland suitability group 3s2; wildlife group 1; recreation group 3.

Cut and Fill Land

Cut and fill land (C.F.) occurs where soil material has been excavated and moved to another location. Size and shape are determined by the specific use of the area.

Cut and fill land ranges widely in texture. Underlying material is exposed at excavated sites and a mixture of surface layer, subsoil, and material is used for fill. The composition of areas can be estimated by referring to characteristics of surrounding undisturbed soils shown on the soil map.

In most areas fertility and organic-matter content are low. If areas are vegetated, fertilization based on soil test and texture of the soil material is needed. Top-dressing and irrigation are needed in some areas. Because most areas have been compacted by machinery, permeability and percolation rate are low. Areas are subject to severe erosion if slopes are unprotected.

Cut and fill land is used mainly at highway right-of-way locations. Most other areas of use are airports, railroads, or urban developments. Cut and fill land is not assigned to a capability unit or a woodland, wildlife, or recreation group.

Denny Series

The Denny series consists of nearly level, poorly drained soils in depressions on uplands. These soils formed in loess under native, water-tolerant grass vegetation.

In a representative profile the surface layer is very dark gray silt loam about 9 inches thick. The subsurface layer is light brownish-gray, mottled silt loam about 5 inches thick. The subsoil is mainly heavy silty clay loam about 44 inches thick. It is mainly light brownish gray and light gray and is mottled with brown. The underlying material is light olive-gray silt loam mottled with yellowish brown.

Denny soils are slowly permeable and have high available water capacity. They are better suited to crops tolerant of a seasonally high water table and a slowly drained subsoil than to most other crops.

Representative profile of Denny silt loam, 171 feet north of west corner of east-west fence and 128 feet east of road fence in the southwest corner of SW¼-SW¼NW¼ sec. 20, T. 16 N., R. 2 W.

Ap—0 to 9 inches, very dark gray (10YR 3/1) and streaks of light brownish-gray (10YR 6/2) silt loam; moderate, very fine and fine, granular structure; friable; slightly acid; abrupt, smooth boundary.

A2—9 to 14 inches, light brownish-gray (10YR 6/2) silt loam; few, fine, distinct, dark yellowish-brown (10YR 4/4) and yellowish-brown (10YR 5/6) mottles; thin, discontinuous, grayish-brown (10YR 5/2) silt coatings on all peds; weak, medium, platy structure parting to moderate, very fine, subangular blocky; friable; dark grayish-brown (10YR 4/2) worm casts in worm channels; few fine iron-manganese concretions; numerous pores in peds; medium acid; abrupt, smooth boundary.

B21tg—14 to 20 inches, light brownish-gray (2.5Y 6/2) silty clay loam; few, fine, prominent, strong-brown (7.5YR 5/8) mottles and few, fine, distinct, dark yellowish-brown (10YR 4/4) mottles; thin, continuous, grayish-brown (10YR 5/2) clay films on faces of peds; some light-gray (10YR 7/1) dry, silt coatings; moderate, fine, subangular blocky and angular blocky structure; firm; few fine pores in peds; few fine iron-manganese concretions; strongly acid; clear, smooth boundary.

B22tg—20 to 25 inches, light-gray (2.5Y 7/2) heavy silty clay loam, light olive brown (2.5Y 5/4) crushed; few, fine, distinct, yellowish-brown (10YR 5/6 and 10YR 5/8) mottles and few, fine, prominent, strong-brown (7.5YR 5/6) mottles; thin, continuous, light brownish-gray (2.5Y 6/2) clay films on faces of all peds; some light-gray (10YR 7/1) dry and white (10YR 8/1) dry, silt coatings; strong, medium, angular blocky structure; firm; few fine iron-manganese concretions; few fine pores; strongly acid; clear, smooth boundary.

B23tg—25 to 44 inches, light brownish-gray (2.5Y 6/2) heavy silty clay loam; few, fine, prominent, strong-brown (7.5YR 5/8) mottles and few, fine, distinct, yellowish-brown (10YR 5/6 and 10YR 5/8) mottles; thin, patchy, grayish-brown (2.5Y 5/2) silt coatings; light-gray (10YR 7/1) and white (10YR 8/1) dry; moderate, coarse, prismatic structure; firm; many fine pores; many iron-manganese concretions; medium acid; gradual, wavy boundary.

B3tg—44 to 58 inches, light olive-gray (5Y 6/2) heavy silty clay loam; common, medium, prominent, yellowish-brown (10YR 5/6 and 10YR 5/8) mottles; weak, coarse, prismatic structure; firm; dark grayish-brown (10YR 4/2) coatings in root channels; numerous fine pores; few iron-manganese concretions; slightly acid; clear, smooth boundary.

Cg—58 to 61 inches, light olive-gray (5Y 6/2) heavy silt loam; common, medium, prominent, yellowish-brown (10YR 5/6 and 10YR 5/8) mottles; massive; friable; few iron-manganese concretions; grayish-brown (10YR 5/2) coatings in root channels; neutral.

The solum ranges from 48 to 60 inches in thickness. The silt loam A1 or Ap horizon is 6 to 10 inches thick. The silt loam A2 horizon is 5 to 15 inches thick. It ranges from dark grayish brown to light brownish gray, but darker colors from the A1 horizon are mixed into the A2 horizon in some places. The B horizon is 35 to 45 inches thick. It averages 35 to 40 percent clay, but individual layers range from silty clay loam to silty clay within a given profile. The silt loam C horizon ranges from slightly acid to mildly alkaline.

The Denny soils in Rock Island County do not have the abrupt textural change at the boundary between the A2 horizon and the B21tg horizon defined in the range for the series, but this difference does not alter use or behavior of the soils.

Denny soils formed in thick loess, as did Atterberry and Stronghurst soils. They are more poorly drained and have more clay in the B horizon than Atterberry or Stronghurst soils.

Denny silt loam (45).—In most places this nearly level soil is in depressions on ridgetops. In places it is at the heads of drainageways. Areas are irregularly shaped, mostly somewhat spherical. Most are less than 1 acre in size, but a few are more than 5 acres.

Included with this soil in mapping are a few areas of more productive Muscatine and Sable soils between Denny soils in depressions. Also included, in the vicinity of Foster in Drury Township, are soils similar to Denny silt loam that have a very thick, grayish subsurface layer and have sand at a depth of 40 to 60 inches. The porous underlying sand severely limits sewage lagoons.

Frequently the water table is high in this soil. The organic-matter content is moderate.

This soil is used mainly for cultivated crops, but it is better suited to crops tolerant of a seasonally high water table and a slowly drained subsoil than to most other crops. Because most areas are small, they are generally farmed along with adjacent soils. Capability unit IIw-1; woodland suitability group 3w2; wildlife group 6; recreation group 7.

Dickinson Series

The Dickinson series consists of nearly level to strongly sloping, well-drained to somewhat excessively drained soils on terraces. These soils formed in sandy deposits under native prairie grasses.

In a representative profile the surface layer is mainly very dark gray and very dark grayish-brown sandy loam about 13 inches thick. The subsoil is about 22 inches thick. The upper 14 inches of it is mainly dark-brown sandy loam, and the lower 8 inches is mainly dark yellowish-brown loamy sand. The underlying material is mainly yellowish-brown loose sand.

Dickinson soils are droughty. They are moderately rapidly to rapidly permeable and have low available water capacity. They are better suited to drought-resistant crops than to most others.

Representative profile of Dickinson sandy loam, 0 to 4 percent slopes, 180 feet south of east-west fence, and 36 feet east of north-south field boundary in the northwest corner of NW¼SE¼NW¼ sec. 10, T. 20 N., R. 2 E.

A1—0 to 8 inches, very dark gray (10YR 3/1) sandy loam, moderate, medium, subangular blocky structure parting to moderate, fine and medium, granular; friable; neutral; clear, smooth boundary.

A3—8 to 13 inches, very dark grayish-brown (10YR 3/2) and some very dark gray (10YR 3/1) and dark-brown (10YR 3/3) sandy loam; moderate, medium, subangular blocky structure parting to moderate, fine and medium, granular; friable; neutral; clear, smooth boundary.

B2—13 to 27 inches, dark-brown (10YR 3/3) and some brown to dark-brown (10YR 4/3) sandy loam; moderate, coarse, subangular blocky structure; friable; neutral; clear, smooth boundary.

B3—27 to 35 inches, dark yellowish-brown (10YR 4/4) and some brown to dark-brown (7.5YR 4/4) loamy sand; weak, coarse, subangular blocky structure; very friable; neutral; clear, smooth boundary.

C—35 to 60 inches, yellowish-brown (10YR 5/4), light yellowish-brown (10YR 6/4), and some brown to dark-brown (7.5YR 4/4) sand and fine and medium gravel; single grained; slightly acid.

The solum ranges from 24 to 40 inches in thickness. The A horizon is 10 to 20 inches thick. It is sandy loam or fine sandy loam and ranges from very dark gray to dark brown. The B horizon is 10 to 30 inches thick. The B2 horizon is sandy loam or fine sandy loam. The B3 horizon ranges from sandy loam to loamy sand. The C horizon ranges from sand to sandy loam. It ranges from medium acid to neutral.

Dickinson soils are on terraces, as are Sparta and Hoopeston soils. They are less sandy throughout than Sparta soils. They are better drained than Hoopeston soils.

Dickinson sandy loam, 0 to 4 percent slopes (87A).—In most places this soil is in areas that are irregularly shaped and are in no apparent pattern. Most areas are less than 10 acres in size, but a few are more than 80 acres. This soil has the profile described as representative of the series.

Included with this soil in mapping are small areas of somewhat droughtier, less productive Sparta soils; minor areas of less droughty, somewhat more productive soils that have more silty material in the subsoil; and soils similar to Dickinson sandy loam that have low to very low organic-matter content in the surface layer.

This soil is subject to soil blowing in unprotected areas. Droughtiness is a hazard. The organic-matter content is moderate.

This soil is used mainly for the cultivated crops commonly grown, but is suited to specialty crops if irrigated. Capability unit IIIs-1; woodland suitability group 3s2; wildlife group 7; recreation group 2.

Dickinson sandy loam, 4 to 12 percent slopes (87C).—In most places this soil is on short sides of sand ridges. In other places areas are elongated in the shape of terraces. Most are less than 15 acres in size. This soil has a profile similar to the one described as representative of the series, but in most areas the dark-colored surface layer is somewhat thinner.

Included with this soil in mapping in section 29 of Hampton Township, just north of the subdivision, is an area of sloping Hoopeston sandy loam that has acquired the more poorly drained properties of adjacent soils to the north and west. Use of this soil is limited by a seasonally high water table. A few gravelly areas crop out and are indicated on the soil map by the symbol for gravel. Also included are soils similar to Dickinson sandy loam that have low to very low organic-matter content in the surface layer.

This soil is subject to water erosion and soil blowing if slopes are improperly managed. Droughtiness is a hazard. The organic-matter content is moderate.

This soil is used mainly for the cultivated crops commonly grown, but is suited to specialty crops if erosion is controlled and water is adequate. Capability unit IIIe-2; woodland suitability group 3s2; wildlife group 7; recreation group 3.

Dorchester Series

The Dorchester series consists of nearly level, moderately well drained soils on bottom lands. These soils formed in silty alluvium that is high in content of lime.

In a representative profile the surface layer is very dark gray silt loam about 8 inches thick. The underlying material, to a depth of 26 inches, is mainly dark grayish-brown and very dark gray fine sandy loam that has a few brownish mottles. Below this, it is mainly dark-gray silt loam that has brownish mottles.

Dorchester soils are moderately permeable and have very high available water capacity. Lime concretions, and in places, snail and clam shells cause the high content of lime. The soils are better suited to crops tolerant of high lime content than to most other uses.

Representative profile of Dorchester silt loam, 466 feet generally north along centerline of curved road from north edge of drainage ditch and 39 feet east into field from center of road in the southeast corner of NE¼NW¼NE¼ sec. 14, T. 16 N., R. 6 W.

Ap—0 to 8 inches, very dark gray (10YR 3/1) silt loam; compacted parting to moderate, fine and medium, granular structure; friable; mildly alkaline; clear, smooth boundary.

C1—8 to 13 inches, brown to dark-brown (10YR 4/3) and very dark gray (10YR 3/1) fine sandy loam; compacted parting to moderate, fine, granular structure; very friable; many visible pale-brown (10YR 6/3) sand grains; moderately alkaline; slightly effervescent; clear, smooth boundary.

C2—13 to 26 inches, dark grayish-brown (10YR 4/2) and some very dark gray (10YR 3/1) fine sandy loam; few, fine, faint, brown to dark-brown (10YR 4/3 and 7.5YR 4/4) mottles; weak, medium, subangular blocky structure parting to moderate, fine, granular; very friable; moderately alkaline; strongly effervescent; clear, smooth boundary.

C3—26 to 37 inches, brown to dark-brown (10YR 4/3) and very dark gray (10YR 3/1) silt loam; weak, medium, prismatic structure parting to moderate, fine and medium, granular; friable; moderately alkaline; strongly effervescent; clear, smooth boundary.

C4—37 to 65 inches, dark-gray (10YR 4/1) silt loam; common, fine, distinct, brown to dark-brown (10YR 4/3) mottles; weak, medium, prismatic structure parting to moderate, medium, granular; friable; some earthworm channels; moderately alkaline; strongly effervescent.

The Ap horizon ranges from 6 to 10 inches in thickness. It ranges from silt loam to loam. It is mainly mildly alkaline to moderately alkaline, but in places it is neutral. Most Ap horizons effervesce if tested with hydrochloric acid. The C horizon ranges from 30 to 40 inches in thickness in profiles that have a buried IIAb horizon. Most places have no buried horizon and the C horizon extends to a depth of more than 60 inches. The C horizon is commonly stratified with silt loam, loam, silty clay loam, fine sandy loam, or sandy loam. It is mildly alkaline to moderately alkaline and effervesces if tested with hydrochloric acid. The dark-colored, buried IIAb horizon, where present, ranges from silt loam to silty clay loam and is 10 to 30 inches thick. This buried horizon ranges from slightly acid to mildly alkaline.

Dorchester soils are on bottom lands, as are Orion and Radford soils. They are better drained than Orion and Radford soils. They also have a high content of lime, which is not characteristic of Orion or Radford soils.

Dorchester silt loam (239).—This nearly level soil is on flood plains. Some areas are on bottom lands associated with the larger creeks. Most others are within broad flood plains in a somewhat higher position than most surrounding soils. Most areas are somewhat long and narrow. Most are less than 40 acres in size, but a few are more than 200 acres.

Included with this soil in mapping are some areas where slopes are short and narrow. These areas are about an acre in size and are indicated on the soil map by the symbol for escarpment. A few wet areas less than an acre in size and less productive, sandy areas about 1 acre in size are indicated on the soil map by spot symbols.

Occasionally the water table is high in this soil. Flooding is a hazard on unprotected bottom lands. The organic-matter content is moderate. The high content of lime decreases the amount of available phosphorus.

This soil is used mainly for cultivated crops and pasture. It is better suited to crops tolerant of high natural lime content than to most other crops. Some areas have been converted to woodland. The degree of suitability for any use in areas subject to overflow depends on the frequency and duration of flooding. Capability unit I-3; woodland suitability group 2o4; wildlife group 5; recreation group 6.

Downs Series

The Downs series consists of well-drained, nearly level to moderately sloping soils on uplands. These soils formed in deep loess under mixed grass and timber vegetation.

In a representative profile the surface layer is very dark brown and very dark grayish-brown silt loam about 7 inches thick. The subsurface layer is dark grayish-brown, very dark grayish-brown and brown to dark-brown silt loam about 4 inches thick. The subsoil is about 42 inches thick. The upper 12 inches of it is brown, dark-brown, and dark yellowish-brown silty clay loam. The lower 30 inches is mainly yellowish-brown and light brownish-gray silty clay loam that has brownish and grayish mottles throughout. The underlying material is yellowish-brown and light brownish-gray silt loam.

Downs soils are moderately permeable and have very high available water capacity. They are well suited to all crops commonly grown in the county.

Representative profile of Downs silt loam, 2 to 6 percent slopes, 110 feet east of west end of gate and 240 feet north in the southeast corner of SW¼SE¼SW¼ sec. 30, T. 16 N., R. 2 W.

All—0 to 3 inches, very dark brown (10YR 2/2) silt loam; weak, fine, granular structure; friable; medium acid; clear, smooth boundary.

A12—3 to 7 inches, very dark grayish-brown (10YR 3/2) silt loam; gray to light-gray (10YR 6/1) uncoated silt grains; weak, fine to very fine, granular structure; friable; strongly acid; clear, smooth boundary.

A2—7 to 11 inches, dark grayish-brown (10YR 4/2), very dark grayish-brown (10YR 3/2), and brown to dark-brown (10YR 4/3) silt loam; light-gray to gray (10YR 6/1) uncoated silt grains that are patchy on faces of peds; weak, medium, platy structure parting to weak, fine, subangular blocky; friable; medium acid; clear, smooth boundary.

B1t—11 to 17 inches, brown to dark-brown (10YR 4/3) light silty clay loam; light-gray to gray (10YR 6/1) uncoated silt grains that are patchy on faces of peds; weak, fine, subangular blocky structure; friable; medium acid; gradual, smooth boundary.

B21t—17 to 23 inches, dark yellowish-brown (10YR 4/4) silty clay loam; light-gray to gray (10YR 6/1) uncoated silt grains that are discontinuous on faces of peds; weak, medium, subangular blocky structure parting to moderate, fine, subangular blocky; friable; medium acid; gradual, smooth boundary.

B22t—23 to 28 inches, yellowish-brown (10YR 5/4) and dark yellowish-brown (10YR 4/4) silty clay loam; common, fine, distinct, light brownish-gray (2.5Y 6/2) mottles; light-gray to gray (10YR 6/1) uncoated silt grains that are discontinuous on faces of peds; weak to moderate, medium, subangular blocky structure; friable; medium acid; gradual, smooth boundary.

B23t—28 to 33 inches, light brownish-gray (2.5Y 6/2) silty clay loam; common, fine, distinct, yellowish-brown (10YR 5/4) and dark yellowish-brown (10YR 4/4) mottles; light-gray to gray (10YR 6/1) uncoated silt grains that are discontinuous on faces of peds; moderate, medium, subangular blocky structure; friable; strongly acid; gradual, smooth boundary.

B24t—33 to 39 inches, light brownish-gray (2.5Y 6/2) silty clay loam; common, fine, distinct, yellowish-brown (10YR 5/4) and dark yellowish-brown (10YR 4/4) mottles; light-gray to gray (10YR 6/1) uncoated silt grains that are discontinuous on faces of peds; weak, medium to fine, prismatic structure parting to weak, medium, subangular blocky; friable; strongly acid; gradual, smooth boundary.

B25t—39 to 46 inches, mixed yellowish-brown (10YR 5/6) and light brownish-gray (10YR 6/2) silty clay loam; brown (10YR 5/3) clay films on faces of peds; light brownish-gray (2.5Y 6/2) uncoated silt grains that are continuous on faces of peds; weak, medium, prismatic structure; friable; strongly acid; gradual, smooth boundary.

B3—46 to 53 inches, yellowish-brown (10YR 5/6) and light brownish-gray (10YR 6/2) silt loam; light brownish-gray (2.5Y 6/2) uncoated silt grains on faces of peds; weak, coarse, prismatic structure; friable; strongly acid; gradual, smooth boundary.

C—53 to 60 inches, yellowish-brown (10YR 5/6) and light brownish-gray (10YR 6/2) silt loam; massive; medium acid.

The solum ranges from 40 to 60 inches in thickness. The silt loam A1 or Ap horizon is 6 to 10 inches thick. The silt loam A2 horizon, where present, ranges from 4 to 6 inches in thickness. It commonly ranges from very dark grayish brown to dark grayish brown or dark brown. The silty clay loam B2 horizon ranges from 30 to 50 inches in thickness. The C horizon ranges from medium acid to mildly alkaline.

Downs soils are in a soil pattern with Atterberry and Tama soils. They are better drained than Atterberry soils. They have a thinner dark-colored A horizon than Tama soils.

Downs silt loam, 0 to 2 percent slopes (386A).—In most places this soil is on ridgetops. Areas are irregularly shaped and tend to extend out toward the points of ridges. Most are less than 10 acres in size, but a few are more than 30 acres.

Included with this soil in mapping are Downs soils in urban areas that do not have a surface layer. Interpretations for these areas are based mainly on the subsoil characteristics. A few areas of less productive, poorly drained soils that are less than 1 acre in size are indicated on the soil map by a spot symbol.

This soil is moderate in organic-matter content.

This soil is used mainly for cultivated crops but is well suited to all crops commonly grown in the county. In some places it is used for urban development, and it is well suited to this use. Capability unit I-1; woodland suitability group 2o1; wildlife group 1; recreation group 1.

Downs silt loam, 2 to 6 percent slopes (386B).—In most places this soil is on convex ridgetops. Areas are irregularly shaped. Some near the crest of the ridge tend to extend toward the points of ridgetops, and others finger between and around the more sloping drainageways. Most areas are less than 15 acres in size, but a few are more than 40 acres. This soil has the profile described as representative of the series.

Included with this soil in mapping are Downs soils in urban areas that do not have a surface layer. Interpretations for these areas are based mainly on the sub-

soil characteristics. A few areas of less productive, poorly drained soils are indicated on the soil map by a spot symbol.

This soil is subject to erosion if slopes are improperly managed. The organic-matter content is moderate.

This soil is used mainly for cultivated crops but is well suited to all crops commonly grown in the county. In some places it is used for urban development, and it is well suited to this use. Capability unit IIe-1; woodland suitability group 2o1; wildlife group 1; recreation group 1.

Elkhart Series

The Elkhart series consists of well-drained, strongly sloping to moderately steep soils on uplands. These soils formed in deep loess under natural grass vegetation.

In a representative profile the surface layer is very dark grayish-brown heavy silt loam about 10 inches thick. The subsoil is mainly yellowish brown and is about 17 inches thick. The upper part of it is silty clay loam, and the lower part is silt loam. The underlying material is calcareous, light-gray and gray silt loam.

Elkhart soils are moderately permeable and have high available water capacity. The high content of natural lime in the underlying material decreases the amount of available phosphate and potash. The soils are suited to the cultivated crops commonly grown if erosion is controlled. They are also well suited to commonly grown grasses and legumes.

Representative profile of Elkhart silt loam, 7 to 12 percent slopes, eroded, 305 feet north along farmstead fence from corner post in east-west road fence along Illinois Highway 192 and 488 feet west in the northwest corner of SE¼SW¼SE¼ sec. 7, T. 16 N., R. 3 W.

Ap—0 to 10 inches, very dark grayish-brown (10YR 3/2) heavy silt loam; moderate, fine and medium, granular structure; upper 3 inches friable; massive; slightly acid; abrupt, smooth boundary.

B21t—10 to 14 inches, dark yellowish-brown (10YR 4/4) light silty clay loam; discontinuous dark-brown (10YR 3/3) clay films on faces of peds; moderate, medium, prismatic structure parting to moderate, medium to coarse, subangular blocky; friable; neutral; clear, smooth boundary.

B22t—14 to 20 inches, yellowish-brown (10YR 5/4) light silty clay loam; few, fine, distinct, reddish-brown (5YR 5/4) mottles; thin, continuous, brown and dark-brown (10YR 4/3) clay films on faces of peds; strong, medium, prismatic structure; friable; neutral; clear, smooth boundary.

B3—20 to 27 inches, yellowish-brown (10YR 5/4) heavy silt loam; discontinuous brown and dark-brown (10YR 4/3) clay films on faces of peds; weak, medium and coarse, prismatic structure; friable; 1-inch band of yellowish-red (5YR 4/6 and 5YR 4/8) iron concretions at a depth of 23 inches; moderately alkaline; clear, smooth boundary.

C—27 to 60 inches, light-gray and gray (5Y 6/1) silt loam; massive; streaks of yellowish-brown (10YR 5/6) and strong-brown (7.5YR 5/6) iron concretions throughout; moderately alkaline; strongly effervescent.

The solum ranges from 20 to 40 inches in thickness. It is very dark grayish brown to dark brown to a depth of 10 to 15 inches. The A horizon ranges from 6 to 12 inches in thickness. The B horizon is 20 to 25 inches thick. The B2t horizon is light silty clay loam or medium silty clay loam. The B3 horizon is light silty clay loam or silt loam. The silt loam C horizon is mildly alkaline or moderately alkaline.

Elkhart soils formed in thick loess, as did Tama and Sylvan soils. Their solum is thinner than that of Tama soils. They are dark colored to a greater depth than Sylvan soils.

Elkhart silt loam, 7 to 12 percent slopes, eroded (567D2).—In most places this soil is on sides or at upper ends of valleys below less sloping ridgetops. Areas are mainly less than 5 acres in size, but a few are more than 35 acres. This soil has the profile described as representative of the series.

Included with this soil in mapping are severely eroded areas that are less than 1 acre in size and are indicated on the soil map by a spot symbol. These areas have increased runoff, poor tilth, and low organic-matter content. Also included are a few areas of somewhat more productive Tama soils; a few areas of soils similar to Elkhart soils that are not calcareous at a depth above 40 inches; and a few areas of Elkhart soils where the surface layer is not eroded and tilth is good.

This soil is subject to severe erosion if slopes are improperly managed. The organic-matter content is moderate to moderately low.

This soil is used mainly for cultivated crops. If properly managed, it is suited to all crops commonly grown in the county. Capability unit IIIe-1; woodland suitability group 1o1; wildlife group 1; recreation group 3.

Elkhart silt loam, 12 to 18 percent slopes, eroded (567E2).—In most places this soil is on sides or at upper ends of valleys below less sloping ridgetops. Areas are mainly less than 5 acres in size, but a few are more than 35 acres.

Included with this soil in mapping are severely eroded areas that are less than 1 acre in size and are indicated on the soil map by a spot symbol. These areas have increased runoff, poor tilth, and low organic-matter content. Also included are a few areas of somewhat more productive soils similar to Elkhart soils that lack free carbonates at a depth above 40 inches and a few areas of Elkhart soils where the surface layer is not eroded and tilth is good.

This soil is subject to severe erosion if slopes are improperly managed. The organic-matter content is moderate to moderately low.

This soil is used mainly for cultivated crops. The moderately steep slopes, however, limit suitability mainly to grasses and legumes. Capability unit IVe-1; woodland suitability group 2r2; wildlife group 2; recreation group 4.

Fayette Series

The Fayette series consists of well-drained, gently sloping to steep soils on uplands. These soils formed in deep loess under native timber vegetation.

In a representative profile the surface layer is mainly dark grayish-brown silt loam about 3 inches thick. The subsurface layer is dark grayish-brown to brown silt loam about 7 inches thick. The subsoil is mainly dark yellowish-brown silty clay loam about 50 inches thick. It is mottled in the lower part. The underlying material is dark yellowish-brown silt loam.

Fayette soils are moderately permeable and have high to very high available water capacity. They are suited to the cultivated crops commonly grown if erosion is controlled. They are also well suited to commonly grown grasses and legumes.

Representative profile of Fayette silt loam, 2 to 6 percent slopes, 75 feet north of middle of field gate and 150 feet west of road fence in the southeast corner of SE¼NE¼NE¼ sec. 20, T. 16 N., R. 2 W.

A1—0 to 3 inches, dark grayish-brown (10YR 4/2) silt loam; thin, patchy, brown (10YR 4/3) coatings on all peds; weak, thin, platy structure parting to moderate, medium, granular; friable; some light-gray (10YR 7/1) dry, uncoated silt grains; some streaks of brown (10YR 5/3) silt loam; neutral; clear, smooth boundary.

A21—3 to 6 inches, dark grayish-brown (10YR 4/2) and dark-brown to brown (10YR 4/3) silt loam; moderate, thin, platy structure parting to moderate, medium and coarse, granular; friable; fewer light-gray (10YR 7/1) dry, uncoated silt grains than in A1 horizon; slightly acid; clear, smooth boundary.

A22—6 to 10 inches, brown (10YR 5/3) silt loam; thin, patchy, dark grayish-brown (10YR 4/2) coatings on all peds; very few light-gray (10YR 7/1) dry, uncoated silt grains; moderate, fine and medium, subangular blocky structure; friable; slightly acid; clear, smooth boundary.

B1t—10 to 12 inches, yellowish-brown (10YR 5/4) light silty clay loam; few light-gray (10YR 7/1) dry, silt grains; moderate, medium and coarse, subangular blocky structure; friable; slightly acid; clear, smooth boundary.

B21t—12 to 19 inches, dark yellowish-brown (10YR 4/4) silty clay loam; thin, continuous, brown to dark-brown (10YR 4/3) clay films on faces of peds; few light-gray (10YR 7/1) dry, uncoated silt grains; moderate, medium, subangular blocky structure; friable; medium acid; clear, smooth boundary.

B22t—19 to 29 inches, dark yellowish-brown (10YR 4/4) silty clay loam; thin, continuous, brown to dark-brown (10YR 4/3) clay films on faces of peds; few light-gray (10YR 7/1) dry, uncoated silt grains; strong, fine, prismatic structure parting to moderate, medium, subangular blocky; firm; strongly acid; clear, smooth boundary.

B23t—29 to 42 inches, dark yellowish-brown (10YR 4/4) silty clay loam; thin, continuous, brown to dark-brown (10YR 4/3) clay films on all peds; few light-gray (10YR 7/1) dry, uncoated silt grains; strong, medium and coarse, prismatic structure parting to moderate, coarse, subangular blocky and angular blocky; firm; strongly acid; clear, smooth boundary.

B3t—42 to 60 inches, dark yellowish-brown (10YR 4/4) silty clay loam; common, fine, distinct, pale-brown (10YR 6/3) and light brownish-gray (10YR 6/2) mottles and common, fine, prominent, yellowish-red (5YR 4/6) and strong-brown (7.5YR 5/6) mottles between depths of 42 and 44 inches and 51 and 53 inches; moderate, medium and coarse, prismatic structure parting to moderate, medium and coarse, subangular blocky; firm; medium acid; clear, smooth boundary.

C—60 to 70 inches, dark yellowish-brown (10YR 4/4) silt loam; massive; medium acid.

The solum ranges from 40 to 60 inches in thickness. In undisturbed areas the A horizon is silt loam and ranges from 5 to 12 inches in thickness. In some undisturbed areas the A1 horizon is less than 6 inches thick and ranges from very dark gray (10YR 3/1) to very dark grayish brown (10YR 3/2). The silty clay loam B horizon ranges from 30 to 50 inches in thickness. In some places it is mottled and grayish at a depth of less than 40 inches. The silt loam C horizon ranges from medium acid to moderately alkaline.

Fayette soils are in a soil pattern with Sylvan and Rozetta soils. They have a thicker solum than Sylvan soils. They are better drained than Rozetta soils.

Fayette silt loam, 2 to 6 percent slopes (280B).—This soil is on convex ridgetops. Areas are irregularly shaped. Some finger between and around the more sloping drainageways, and some are at the crest of stronger side slopes. Most are less than 20 acres in size, but a few are more than 300 acres. This soil has the profile described as representative of the series.

Included with this soil in mapping in or near some metropolitan areas are Fayette soils from which the surface layer has been removed. Interpretations for these areas are based mainly on the subsoil characteristics. Also included are less productive sandy areas and a few areas of less productive, poorly drained soils that are indicated on the soil map by spot symbols.

This soil is subject to erosion if slopes are improperly managed. The organic-matter content is moderately low.

This soil is used mainly for cultivated crops but is well suited to all crops commonly grown in the county. In some places, this soil is used for urban development, and it is well suited to this use. Capability unit IIe-1; woodland suitability group 2o1; wildlife group 1; recreation group 1.

Fayette silt loam, 4 to 7 percent slopes, eroded (280C2).—In most places this soil is at upper ends of valleys and on narrow, convex ridgetops. Most areas are less than 5 acres in size, but a few are more than 25 acres. The profile of this soil is similar to the one described as representative of the series, but the surface layer is thinner and some of the subsoil material is mixed with it.

Included with this soil in mapping are severely eroded areas that are less than 1 acre in size and are indicated on the soil map by a spot symbol. These areas have increased runoff, poor tilth, and very low organic-matter content. A few less productive sandy areas are indicated on the soil map by a spot symbol. Also included are some areas, less than 1 acre in size, where slopes are sharp and narrow. These areas are indicated on the soil map by the symbol for escarpments.

This soil is subject to severe erosion if slopes are improperly managed. The organic-matter content is low.

This soil is used mainly for cultivated crops. If properly managed, it is suited to all crops commonly grown in the county. Capability unit IIe-1; woodland suitability group 2o1; wildlife group 1; recreation group 1.

Fayette silt loam, 7 to 12 percent slopes, eroded (280D2).—In most places this soil is on sides or at upper ends of valleys below less sloping ridgetops. In a few places it is on the upper part of slopes, above loamy or shaly soils. Most areas are less than 5 acres in size, but a few are more than 15 acres. The profile of this soil is similar to the one described as representative of the series, but the surface layer is thinner and some of the subsoil is mixed with it.

Included with this soil in mapping are severely eroded areas that are less than 1 acre in size and are indicated on the soil map by a spot symbol. These areas have increased runoff, poor tilth, and very low organic-

matter content. Some areas of Fayette soils where the surface layer is uneroded and tilth is good are included. A few very poorly drained soils are indicated on the soil map by the symbol for wet spots. Also included are a few soils in which the surface layer and subsoil are less than 40 inches thick. The shortage of good compaction material in these soils should be considered before they are used for embankments.

This soil is subject to severe erosion if slopes are improperly managed. The organic-matter content is low.

This soil is used mainly for cultivated crops. If properly managed, it is suited to all crops commonly grown in the county. Capability unit IIIe–1; woodland suitability group 2o1; wildlife group 1; recreation group 3.

Fayette soils, 7 to 12 percent slopes, severely eroded (280D3).—In most places these soils are on short sides or at upper ends of valleys below less sloping ridgetops. In a few places they are on the upper part of slopes, above loamy or shaly soils. Most areas are less than 5 acres in size, but a few are more than 15 acres. A profile of these soils is similar to the one described as representative of the series, but the surface layer is mainly the brownish silty clay loam subsoil.

Included with these soils in mapping are a few areas of soils similar to Fayette soils where the surface layer and subsoil are less than 40 inches thick. The shortage of good compaction material in these soils should be considered before they are used for embankments. Also included are sandy spots that are less than 1 acre in size and are indicated on the soil map by a spot symbol.

These soils are subject to further erosion if slopes are improperly managed. Runoff is rapid, and infiltration is slow. Most of the original surface layer is missing, tilth is poor, and organic-matter content is very low.

These soils are used or have been used mainly for cultivated crops and pasture. The severe hazard of erosion, however, limits suitability mainly to grasses and legumes or trees. Capability unit IVe–1; woodland suitability group 2o1; wildlife group 1; recreation group 3.

Gravelly Terrace Escarpments

Gravelly terrace escarpments (G577) occur as strongly sloping to steep, somewhat long and narrow breaks. Slopes are short and separate less sloping soils at different levels on terraces. Most areas are less than 10 acres in size.

In most places the surface layer is brownish gravelly sandy loam less than 6 inches thick. The underlying material is mainly brownish gravel and medium to coarse sand.

Gravelly terrace escarpments are droughty. Permeability is rapid, and available water capacity is very low. The organic-matter content is low. Soil blowing is severe on unprotected slopes.

Most terrace escarpments are used for pasture and are well suited to this use. Some are cropped or are idle. Capability unit VIs–1; woodland suitability group 3s3; wildlife group 7; recreation group 4.

Gravel Pit

Gravel pit (G.P.) occurs where gravel has been mechanically removed. Many areas are rectangular or square in shape, but some are confined within irregular property lines. Some areas are small, but a few are more than 100 acres in size.

In most areas the gravel is excavated to a depth of many feet, and gravel and sand are exposed in most of the remaining area.

Fertility and organic-matter content are low. If areas are reclaimed and vegetated, topdressing and fertilization are required. Some areas also need irrigation, and others need leveling.

Some areas are covered with water. Spoil material removed in excavation is adjacent to most areas. This material is part of the gravel pit, or in places is fill material. Some gravel pits are idle or are used for trash collection. Gravel pit is not assigned to a capability unit or a woodland, wildlife, or recreation group.

Hickory Series

The Hickory series consists of moderately steep to very steep, moderately well drained and well drained soils on uplands. These soils formed mainly in loamy glacial till under native hardwoods.

In a representative profile the surface layer is grayish-brown silt loam about 3 inches thick. The subsurface layer is light yellowish-brown and brownish-yellow silt loam about 7 inches thick. The subsoil is about 38 inches thick. The upper 7 inches of it is yellowish-brown silt loam and brownish-yellow silty clay loam. The next 10 inches is strong-brown silty clay loam and reddish-yellow clay. The lower 21 inches is brownish-yellow and olive-yellow clay loam. The underlying material is yellowish silt loam and sand.

Hickory soils are moderately permeable and have high to moderate available water capacity. They are better suited to grasses, legumes, or trees than to other crops. Most slopes are too steep for row crops.

Representative profile of Hickory silt loam, 18 to 30 percent slopes, 138 feet north parallel to Illinois Route 92 and at crest of roadbank, from center of gate to Boy Scouts of America property in the southeast corner of SE¼NE¼SW¼ sec. 35, T. 17 N., R. 4 W.

A1—0 to 3 inches, grayish-brown (10YR 5/2) silt loam, light gray (10YR 7/2) dry; moderate, medium, granular structure; friable; mildly alkaline; abrupt, smooth boundary.

A21—3 to 7 inches, light yellowish-brown (10YR 6/4) silt loam, white (10YR 8/2) dry; strong, thin, platy structure; friable; slightly acid; abrupt, smooth boundary.

A22—7 to 10 inches, brownish-yellow (10YR 6/6) silt loam, yellow (10YR 8/6) dry; moderate, thin and medium, platy structure; friable; strongly acid; abrupt, smooth boundary.

B1t—10 to 12 inches, yellowish-brown (10YR 5/6) heavy silt loam, yellow (10YR 7/6) dry; discontinuous, light-gray (10YR 7/1) dry, uncoated silt grains on faces of peds; moderate, fine and medium, subangular blocky structure; friable; very strongly acid; abrupt, smooth boundary.

B21t—12 to 17 inches, brownish-yellow (10YR 6/6) light silty clay loam; moderately thick, discontinuous, brown (7.5YR 4/4) clay films on faces of peds; discontinuous, light-gray (10YR 7/1) dry, uncoated silt grains on faces of peds; strong, fine and medium, subangular blocky structure; friable; very strongly acid; clear, smooth boundary.

IIB22t—17 to 23 inches, strong-brown (7.5YR 5/6) heavy silty clay loam and visible sand grains; patchy, light-gray (10YR 7/1) dry, uncoated silt grains on faces of peds; moderately thick, discontinuous, brown (7.5YR 4/4) clay films on faces of peds; strong, fine and medium, subangular blocky and angular blocky structure; firm; very strongly acid; clear, smooth boundary.

IIB23t—23 to 27 inches, reddish-yellow (7.5YR 6/6) light clay; moderately thick, continuous, brown (7.5YR 4/4) clay films on faces of peds; strong, fine and medium, prismatic structure parting to strong, medium to coarse, subangular blocky and angular blocky; very firm; some small black (N 2/0) iron-manganese concretions and some gravel; strongly acid; clear, smooth boundary.

IIB24t—27 to 40 inches, brownish-yellow (10YR 6/6) light clay loam; moderately thick, discontinuous, brown (7.5YR 4/4) clay films on faces of peds; discontinuous, black (5YR 2/1) manganese coatings on faces of peds; strong, medium, prismatic structure parting to strong, coarse, subangular blocky and angular blocky; firm; very small yellow shale fragments and a band of brown (10YR 5/3) and very pale brown (10YR 7/4) shaly material at a depth of 32 to 34 inches; medium acid; gradual, smooth boundary.

IIB3t—40 to 48 inches, olive-yellow (2.5Y 6/6) light clay loam; common, fine, distinct, very pale brown (10YR 7/3) and yellow (10YR 7/6) mottles, few, fine, prominent, brown (7.5YR 5/4) mottles, and common, medium, faint, light yellowish-brown (2.5Y 6/4) mottles; moderately thick, patchy, brown (10YR 5/3) clay films on faces of peds; moderate, coarse, subangular blocky structure; firm; horizon is influenced by shale; neutral; gradual, smooth boundary.

IIC—48 to 58 inches, mixed brownish-yellow (10YR 6/6) and yellow (10YR 7/8) silt loam and visible sand; brown (7.5YR 5/4 and 10YR 5/3) clay films in root channels; massive; thin black (5YR 2/1) manganese coatings and few white (10YR 8/2) coatings; moderately alkaline; strongly effervescent.

The solum ranges from 42 to 60 inches in thickness. The loess cap is as much as 18 inches thick. In undisturbed areas the A horizon ranges from silt loam to loam and is 5 to 10 inches thick. In some undisturbed areas the A1 horizon is less than 6 inches thick and ranges from very dark gray (10YR 3/1) to very dark grayish brown (10YR 3/2). The B horizon ranges from 30 to 50 inches in thickness. The upper part of it ranges from silty clay loam to clay loam, and the middle and lower parts range from clay to light clay. The B3 horizon and C horizon range from neutral to moderately alkaline. The C horizon ranges from silt loam to clay loam.

Hickory soils are on uplands, as are Atlas and High Gap soils. Hickory soils are better drained and have less clay in the B horizon than Atlas soils. They do not have the underlying shale that is typical of High Gap soils.

Hickory silt loam, 12 to 18 percent slopes, eroded (8E2).—In most places this soil is on sides of valleys, commonly between less sloping ridgetops and nearly level bottom lands or drainageways. In places it is at the heads of drainageways. Most areas are less than 10 acres in size, but a few are more than 30 acres. The profile of this soil is similar to the one described as representative of the series, but the surface layer is thinner and some of the subsoil material is mixed with it.

Included with this soil in mapping are soils similar to Hickory soils that are alkaline at a depth below about 30 inches. The high content of natural lime in the root zone decreases the amount of available phosphate and potash. Included are a few areas of Hickory soils where the surface is uneroded and tilth is good. Also included are severely eroded, less productive areas that are indicated on the soil map by a spot symbol.

This soil is subject to severe erosion if slopes are improperly managed. The organic-matter content is low.

This soil is used or has been used mainly for cultivated crops and pasture. The severe hazard of erosion and moderately steep slopes, however, limit its suitability mainly to grasses and legumes or trees. Capability unit IVe–1; woodland suitability group 1r2; wildlife group 2; recreation group 4.

Hickory silt loam, 18 to 30 percent slopes (8F).—In most places this soil is on sides of valleys, commonly between less sloping ridgetops and nearly level bottom lands or drainageways. In places it is at the heads of drainageways. Most areas are less than 10 acres in size, but a few are more than 60 acres. This soil has the profile described as representative of the Hickory series.

Included with this soil in mapping are soils similar to Hickory soils that are alkaline at a depth below about 30 inches. The high content of natural lime in the root zone decreases the amount of available phosphate and potash. Included are some areas of eroded Hickory soils where part of the surface layer is missing and tilth is poorer. Less productive, severely eroded areas are indicated on the soil map by a spot symbol. Also included are some very steep areas where slopes are narrow. Most of these areas are less than 5 acres in size and are indicated on the soil map by the symbol for escarpment.

This soil is subject to erosion if slopes are improperly managed. The organic-matter content is moderately low.

This soil is used mainly for forage crops or trees and is suited to such use. Capability unit VIe–1; woodland suitability group 1r2; wildlife group 3; recreation group 4.

Hickory soils, 12 to 18 percent slopes, severely eroded (8E3).—In most places these soils are on sides of valleys between less sloping ridgetops and nearly level bottom lands or drainageways. In places they are at the heads of drainageways. Most areas are less than 10 acres in size, but a few are more than 40 acres. A profile of these soils is similar to the one described as representative of the series, but the surface layer is mainly the yellowish clay loam subsoil.

Included with these soils in mapping are soils similar to Hickory soils that are alkaline at a depth below about 24 inches. The high content of natural lime in the root zone decreases the amount of available phosphate and potash. Also included are outcrops of shale or sandstone. These less productive areas are indicated on the soil map by the symbol for rock outcrop.

These soils are subject to further erosion if slopes are improperly managed. Runoff is high, and infiltra-

tion is slow. Most of the original surface layer has been eroded away and, as a result, tilth is poor and organic-matter content is very low.

These soils are used or have been used mainly for cultivated crops and pasture. The severe hazard of erosion and moderately steep slopes, however, limit their suitability to grasses and legumes or trees. Capability unit VIe–1; woodland suitability group 1r2; wildlife group 2; recreation group 4.

Hickory soils, 18 to 30 percent slopes, severely eroded (8F3).—In most places these soils are on sides of valleys, commonly between less sloping ridgetops and nearly level bottom lands or drainageways. In places they are at the heads of drainageways. Most areas are less than 10 acres in size, but a few are more than 40 acres. A profile of these soils is similar to the one described as representative of the series, but the surface layer is mainly the yellowish clay loam subsoil.

Included with these soils in mapping are soils similar to Hickory soils that are alkaline at a depth below about 24 inches. The high content of natural lime in the root zone decreases the amount of available phosphate and potash. Also included are some very steep areas where slopes are narrow. Most of these areas are less than 5 acres in size and are indicated on the soil map by the symbol for escarpment.

These Hickory soils are subject to further erosion if slopes are improperly managed. Runoff is rapid, and infiltration is slow. Most of the original surface layer has been eroded away and, as a result, tilth is poor and organic-matter content is very low.

These soils are used or have been used mainly for cultivated crops and pasture. The severe hazard of erosion and steep slopes, however, limit their suitability to grasses and legumes or trees. Capability unit VIe–1; woodland suitability group 1r2; wildlife group 3; recreation group 4.

Hickory-Atlas complex, 12 to 18 percent slopes, severely eroded (946E3).—In most places this mapping unit is on sides of valleys between less sloping ridgetops and nearly level bottom lands or drainageways. In places it is at the heads of drainageways. It is about 60 percent Hickory soils and about 40 percent Atlas soils. Hickory soils commonly occupy the lower to middle parts of the slope, and Atlas soils are on the more eroded middle to upper parts. Most areas are less than 10 acres in size, but a few are more than 25 acres. The profiles of these soils are similar to the ones described as representative of the Hickory and Atlas series, but the surface layer of the Hickory soil is mainly the yellowish clay loam subsoil.

Included with these soils in mapping are soils that have a clayey buried soil exposed at the surface. The overlying material has been eroded away, and tilth is very poor. Outcrops of shale or sandstone are on some slopes and are indicated on the soil map by the symbol for rock outcrop. Some steep to very steep areas where slopes are narrow are indicated on the soil map by the symbol for escarpments. These areas are less than 5 acres in size. Included are soils similar to Hickory soils that are alkaline at a depth below about 24 inches. The high content of natural lime in the root zone decreases the amount of available phosphate and potash. Also included are soils that have 20 to 40 inches of loess underlain by a fine-textured buried soil that are on about one-fourth of the upper parts of some slopes and a few areas of silty Sylvan soils that are near the heads of valleys and on opposing slopes.

These soils are subject to further erosion if slopes are improperly managed. Runoff is rapid, and infiltration is slow. Almost all the original surface layer has been eroded away and, as a result, tilth is very poor, and organic-matter content is very low. In places hillside seepage requires special drainage.

These soils are used or have been used mainly for cultivated crops and pasture. The severe hazard of erosion and moderately steep slopes, however, limit suitability to grasses and legumes or trees. Capability unit VIIe–2; woodland suitability group 3r2; wildlife group 2; recreation group 4.

Hickory-Atlas complex, 18 to 30 percent slopes, severely eroded (946F3).—In most places this mapping unit is on sides of valleys, commonly between less sloping ridgetops and nearly level bottom lands or drainageways. In places it is at the heads of drainageways. It is about 60 percent Hickory soils, and about 40 percent Atlas soils. Hickory soils commonly occupy the lower to middle parts of the slope, and Atlas soils occupy the more eroded middle to upper parts. Most areas are less than 10 acres in size, but a few are more than 25 acres. The profiles of these soils are similar to the ones described as representative of the Hickory and Atlas series, but the surface layer of the Hickory soil is mainly the yellowish clay loam subsoil.

Included with these soils in mapping are soils that have a clayey buried soil exposed at the surface. The overlying material has been eroded away, and tilth is very poor. Included are soils that have 20 to 40 inches of loess underlain by a fine-textured buried soil that are on about one-fourth of the upper parts of some slopes and a few areas of silty Sylvan soils that are near the heads of valleys and on opposing slopes. Also included are soils similar to Hickory soils that are alkaline at a depth below about 24 inches. The high content of natural lime in the root zone decreases the amount of available phosphate and potash.

These soils are subject to further erosion if slopes are improperly managed. Runoff is high, and infiltration is slow. Almost all the original surface layer is eroded away, and as a result, tilth is very poor and organic-matter content is very low. In places hillside seepage requires special drainage.

These soils are used or have been used mainly for cultivated crops and pasture. The severe hazard of erosion and steep slopes, however, limit suitability to grasses and legumes or trees. Capability unit VIIe–2; woodland suitability group 3r2; wildlife group 3; recreation group 4.

Hickory-High Gap silt loams, 12 to 18 percent slopes, eroded (945E2).—In most places this mapping unit is on sides of valleys between less sloping ridgetops and nearly level bottom lands or drainageways. In places it is at the heads of drainageways. It is about 60 percent Hickory silt loam or loam and about 40 percent High Gap silt loam or loam. Hickory soils commonly occupy

the upper parts of the slope, and High Gap soils occupy the lower part. Most areas are less than 15 acres in size, but a few are more than 80 acres. The profiles of these soils are similar to the ones described as representative of the Hickory and High Gap series, but the surface layer is thinner and some of the subsoil material is mixed with it.

Included with these soils in mapping are less productive soils that have clay shale within 20 inches of the surface and a few areas of Hickory and High Gap soils where the surface layer is uneroded and tilth is good. Included are soils similar to Hickory soils that are alkaline at a depth below about 30 inches. The high content of natural lime in the root zone decreases the amount of available phosphate and potash. Also included are outcrops of shale or sandstone and severely eroded areas. These less productive areas are indicated on the soil map by spot symbols.

These soils are subject to severe erosion if slopes are improperly managed. In places hillside seepage requires special drainage. The organic-matter content is low.

These soils are or have been used mainly for cultivated crops and pasture. The severe hazard of erosion and moderately steep slopes, however, limit their suitability mostly to grasses and legumes or trees. Capability unit VIe–2; woodland suitability group 3r2; wildlife group 2; recreation group 4.

Hickory-High Gap silt loams, 18 to 30 percent slopes (945F).—In most places this mapping unit is on sides of valleys, commonly between less sloping ridgetops and nearly level bottom lands or drainageways. In places it is at the heads of drainageways. It is about 60 percent Hickory silt loam or loam and about 40 percent High Gap silt loam or loam. Hickory soils commonly occupy the upper part of the slope, and High Gap soils occupy the lower part. Most areas are less than 80 acres in size, but a few are more than 200 acres. The High Gap soil has the profile described as representative of the High Gap series.

Included with these soils in mapping are less productive soils that have clay shale within 20 inches of the surface and some areas of eroded Hickory and High Gap soils where part of the surface layer is missing and tilth is poorer. Included are soils similar to Hickory soils that are alkaline at a depth below about 30 inches. The high content of natural lime in the root zone decreases the amount of available phosphate and potash. Also included are severely eroded areas; outcrops of clay shale, shale bedrock, or sandstone; and some very steep escarpments where slopes are short. Most of these areas are less productive, and the escarpments are less than 5 acres in size. They are indicated on the soil map by spot symbols.

These soils are subject to erosion if slopes are improperly managed. In places hillside seepage requires special drainage. The organic-matter content is moderately low.

These soils are mainly used for forage crops or trees and are suited to this use. Capability unit VIIe–2; woodland suitability group 3r2; wildlife group 3; recreation group 4.

Hickory-High Gap silt loams, 30 to 60 percent slopes (945G).—In most places this mapping unit is on sides of valleys, commonly between less sloping ridgetops and nearly level bottom lands or drainageways. In places it is at the heads of drainageways. It is about 50 percent Hickory soil and about 50 percent High Gap soils. Hickory soils commonly occupy the upper part of the slope, and High Gap soils occupy the lower part. Most areas are less than 100 acres in size, but a few are more than 400 acres. These soils have profiles similar to the ones described as representative of the Hickory and High Gap series, but the subsoil is thinner.

Included with these soils in mapping are less productive soils that have clay shale within 20 inches of the surface and a few areas of eroded Hickory and High Gap soils where part of the surface layer is missing and tilth is poorer. Included are soils similar to Hickory soils that are alkaline at a depth below about 24 inches. The high content of natural lime in the root zone decreases the amount of available phosphate and potash. Also included are severely eroded areas and outcrops of shale or sandstone outcrops on some slopes. These less productive areas are indicated on the soil map by spot symbols.

These soils are subject to erosion if slopes are cleared of trees and improperly managed. In places hillside seepage requires special drainage. The organic-matter content is moderately low.

These soils are used mainly for pasture and woodland, but the very steep slopes and the erosion hazard limit their suitability to trees. Capability unit VIIe–2; woodland suitability group 3r3; wildlife group 3; recreation group 4.

Hickory-Sylvan-Fayette silt loams, 12 to 18 percent slopes, eroded (960E2).—In most places this mapping unit is on sides of valleys and points of narrow drainage divides, commonly between less sloping ridgetops and nearly level bottom lands or drainageways. In places it is at the heads of drainageways. It is about 35 percent Hickory silt loam or loam, about 35 percent Sylvan silt loam, and about 30 percent Fayette silt loam. Hickory soils commonly occupy the lower part of the slope, Sylvan soils occupy the middle to upper parts, and Fayette soils are near the top of side slopes and on points of narrow drainageway divides. Most areas are less than 30 acres in size, but a few are more than 200 acres. The profiles of these soils are similar to the ones described as representative of the Hickory, Sylvan, and Fayette series, but the surface layers are thinner and some of the subsoil material is mixed with them.

Included with these soils in mapping are soils similar to Hickory soils that are alkaline at a depth below about 30 inches. The high content of natural lime in the root zone decreases the amount of available phosphate and potash. Included are a few areas where the surface layer is uneroded and tilth is good and small areas of less productive Atlas silt loam. Also included are less productive, severely eroded areas and some steep to very steep escarpments where slopes are narrow. Most escarpments are less than 5 acres in size. Both these areas are indicated on the soil map by spot symbols.

These soils are subject to severe erosion if slopes are improperly managed. The organic-matter content is low.

These soils are or have been used mainly for cultivated crops and pasture. The severe hazard of erosion and moderately steep slopes, however, limit their suitability mostly to grasses and legumes or trees. Capability unit IVe–1; woodland suitability group 1r2; wildlife group 2; recreation group 4.

Hickory-Sylvan-Fayette complex, 12 to 18 percent slopes, severely eroded (960E3).—In most places this mapping unit is on sides of valleys and points of narrow drainage divides, commonly between less sloping ridgetops and nearly level bottom lands or drainageways. In places it is at the heads of drainageways. It is about 40 percent Hickory soils, about 35 percent Sylvan soils, and about 25 percent Fayette soils. Hickory soils commonly occupy the lower part of the slope; Sylvan soils occupy the middle to upper parts; and Fayette soils are near the top of side slopes and on points of narrow drainageway divides. Most areas are less than 30 acres in size, but a few are more than 200 acres. The profiles of these soils are similar to the ones described as representative of the Hickory, Sylvan, and Fayette series, but the surface layers are mostly the silty clay loam or clay loam subsoil materials.

Included with these soils in mapping are soils similar to Hickory soils that are alkaline at a depth below about 24 inches. The high content of natural lime in the root zone decreases the amount of available phosphate and potash. Included are small areas of less productive Atlas soils. Some steep to very steep areas where slopes are narrow are less than 5 acres in size and are indicated on the soil map by the symbol for escarpments. Also included are several small pits that are indicated on the soil map by the symbol for gravel.

These soils are subject to further erosion if slopes are improperly managed. Runoff is rapid, and infiltration is slow. Most of the original surface layer is missing and, as a result, tilth is poor and organic-matter content is very low.

These soils are or have been used mainly for cultivated crops and pasture. The severe erosion and moderately steep slopes, however, limit their suitability to grasses and legumes or trees. Capability unit VIe–1; woodland suitability group 1r2; wildlife group 2; recreation group 4.

Hickory-Sylvan-Fayette silt loams, 18 to 30 percent slopes (960F).—In most places this mapping unit is on sides of valleys, commonly between less sloping ridgetops and nearly level bottom lands or drainageways. In places it is at the heads of drainageways. It is about 40 percent Hickory silt loam or loam, about 40 percent Sylvan silt loam, and about 20 percent Fayette silt loam. Hickory soils commonly occupy the lower to middle parts of the slope; Sylvan soils occupy the middle to upper parts; and Fayette soils are near the top of slopes. In places, Hickory soils are dominant on slopes nearly parallel to creeks, and Sylvan and Fayette soils occupy the slopes of tributaries away from these larger streams. Most areas are less than 30 acres in size, but a few are more than 200 acres. The Hickory and Sylvan soils have the profiles described as representative of their series, but the profile of the Fayette soil has a thinner subsoil than the one described as representative of the series.

Included with these soils in mapping are soils similar to Hickory soils that are alkaline at a depth below about 30 inches. The high content of natural lime in the root zone decreases the amount of available phosphate and potash. Included are a few areas of eroded soils where part of the surface layer is missing and tilth is poorer and small areas of Atlas silt loam and High Gap silt loam, both of which are less productive. Severely eroded, less productive areas are indicated on the soil map by a spot symbol. Also included are some less productive outcrops of shale or sandstone; some very steep escarpments, less than 5 acres in size, where slopes are narrow; and areas of Cut and fill land in or near urban areas. All these areas are indicated on the soil map by spot symbols.

These soils are subject to erosion if slopes are improperly managed. The organic-matter content is moderately low.

These soils are mainly used for forage crops or trees and are suited to this use. Capability unit VIe–1; woodland suitability group 1r2; wildlife group 3; recreation group 4.

Hickory-Sylvan complex, 18 to 30 percent slopes, severely eroded (960F3).—In most places this mapping unit is on sides of valleys, commonly between less sloping ridgetops and nearly level bottom lands or drainageways. In places it is at the heads of drainageways. It is about 50 percent Hickory soils and about 50 percent Sylvan soils. In most areas Hickory soils occupy the lower to middle parts of the slope, and Sylvan soils occupy the middle to upper parts. In other areas Hickory soils are dominant on slopes nearly parallel to creeks, and Sylvan soils occupy the slopes of tributaries away from these larger streams. Most areas are less than 30 acres in size, but a few are more than 200 acres. The profiles of these soils are similar to the ones described as representative of the Hickory and Sylvan series, but the surface layers are mainly the silty clay loam or clay loam subsoils.

Included with these soils in mapping are soils similar to Hickory soils that are alkaline at a depth below about 24 inches. The high content of natural lime in the root zone decreases the amount of available phosphate and potash. Included are a small acreage of Fayette soils near the tops of slopes in all areas and small areas of Atlas soils and High Gap soils, both of which are less productive. Also included are some very steep areas where slopes are narrow. Most of these areas are less than 5 acres in size and are indicated on the soil map by the symbol for escarpments.

These soils are subject to further erosion if slopes are improperly managed. Runoff is rapid, and infiltration is slow. Most of the original surface layer is missing, and as a result, tilth is poor and organic-matter content is very low.

These soils are or have been used mainly for cultivated crops and pasture. The severe erosion and steep slopes, however, limit their suitability to grasses and legumes or trees. Capability unit VIe–1; woodland suitability group 1r2; wildlife group 3; recreation group 4.

Hickory-Sylvan silt loams, 30 to 60 percent slopes (960G).—In most places this mapping unit is on valley

sides, commonly between less sloping ridgetops and nearly level bottom lands or drainageways. In places it is at the heads of drainageways. It is about 50 percent Hickory silt loam and about 50 percent Sylvan silt loam. In some areas Hickory soils occupy the lower and middle parts of the slope, and Sylvan soils occupy the upper part. In other areas Hickory soils are dominant on slopes nearly parallel to creeks, and Sylvan soils occupy the slopes of tributaries away from these larger streams. Most areas are less than 30 acres in size, but a few are more than 200 acres. These soils have profiles similar to the ones described as representative of the Hickory and Sylvan series, but the subsoil is thinner.

Included with these soils in mapping are areas of soils similar to Hickory soils that are alkaline at a depth above 24 inches. The high content of natural lime in the root zone decreases the amount of available phosphate and potash. Included are a few areas of eroded soils where part of the surface layer is missing and tilth is poorer. Areas of severely eroded soils are indicated on the soil map by a spot symbol. Also included are outcrops of shale and sandstone; a small acreage of Fayette soils, which are near the crests of slopes and occur in all areas; small areas of High Gap silt loam and Atlas silt loam, both of which are less productive; and a few areas of Timula soils, which are on the western bluffs of Drury Township. The shortage of good compaction material in Timula soils should be considered before these soils are used for embankments.

These soils are subject to erosion if slopes are cleared of trees and improperly managed. The organic-matter content is moderately low.

These soils are used mainly for pasture and woodland. The very steep slopes and the erosion hazard, however, limit their suitability to trees. Capability unit VIIe–1; woodland suitability group 3r3; wildlife group 3; recreation group 4.

High Gap Series

The High Gap series consists of moderately steep to very steep, moderately well drained and well drained soils on uplands. These soils formed mainly in loamy glacial till and in the underlying material weathered from shale under a native vegetation of hardwoods.

In a representative profile the surface layer is grayish-brown and brown silt loam about 4 inches thick. The subsurface layer is pale-brown silt loam about 3 inches thick. The upper part of the subsoil is yellowish-brown silt loam about 6 inches thick. The lower part is mainly yellowish-brown clay loam about 24 inches thick. Grayish silty clay shale is at a depth of 37 inches.

High Gap soils are moderately permeable and have high available water capacity. They are better suited to grasses, legumes, or trees than to other crops. Most slopes are too steep to be suited to row crops.

High Gap soils in this county are mapped only in complexes with Hickory soils.

Representative profile of High Gap silt loam in an area of Hickory-High Gap silt loams, 18 to 30 percent slopes, 100 feet north along Illinois Highway 92 at crest of west roadbank, from center of gate to Boy Scouts of America property in the southeast corner of the SE¼NE¼SW¼ sec. 35, T. 17 N., R. 4 W.

A1—0 to 4 inches, grayish-brown (10YR 5/2) and brown (10YR 5/3) silt loam; grayish brown (10YR 5/2) dry; moderate, very fine and medium, granular structure; friable; few sand grains; neutral; abrupt, smooth boundary.

A2—4 to 7 inches, pale-brown (10YR 6/3) and some yellowish-brown (10YR 5/6) silt loam; moderate, medium, platy structure; friable; medium acid; clear, smooth boundary.

B1t—7 to 13 inches, yellowish-brown (10YR 5/6) heavy silt loam; thin, continuous, yellowish-brown (10YR 5/4) clay films on faces of peds; moderate, fine and medium, subangular blocky structure; friable; some pebbles and rock fragments as much as 35 millimeters in diameter; strongly acid; clear, smooth boundary.

B21t—13 to 21 inches, yellowish-brown (10YR 5/6) clay loam; thin, continuous, yellowish-brown (10YR 5/4) clay films on faces of peds; moderate, fine and medium, subangular blocky structure; firm; some pebbles and rock fragments as much as 35 millimeters in diameter; strongly acid; clear, smooth boundary.

B22t—21 to 28 inches, yellowish-brown (10YR 5/6) clay loam; thin, continuous, yellowish-brown (10YR 5/4) clay films on faces of peds; moderate, medium and coarse, subangular blocky structure; firm; some pebbles and rock fragments as much as 35 millimeters in diameter; high shale influence in till; many black (N 2/0) iron-manganese concretions; strongly acid; clear, smooth boundary.

B23t—28 to 32 inches, yellowish-brown (10YR 5/6) sandy clay loam; thin, discontinuous, yellowish-brown (10YR 5/4) clay films on faces of peds; moderate, coarse, subangular blocky structure; firm; high shale content in till; many black (N 2/0) iron-manganese concretions; streaks of olive-gray (5Y 5/2) clay shale; medium acid; abrupt, smooth boundary.

IIB3tg—32 to 37 inches, yellowish-brown (10YR 5/6) and olive-gray (5Y 5/2) clay; thin, shiny, continuous clay films on faces of peds; moderate, coarse, subangular blocky structure; firm; many black (N 2/0) iron-manganese concretions; neutral; abrupt, wavy boundary.

IIC—37 to 55 inches, bluish-gray (5B 6/1) and yellowish-brown (10YR 5/6) silty clay shale; mildly alkaline; slightly effervescent.

The depth to the underlying shale ranges from 20 to 40 inches. The loess cap is as much as 20 inches thick. In undisturbed areas the A horizon ranges from silt loam to loam and is 5 to 10 inches thick. In some undisturbed areas the A1 horizon is less than 6 inches thick and ranges from very dark gray (10YR 3/1) to very dark grayish brown (10YR 3/2). The B horizon ranges from 15 to 30 inches in thickness. It is silty clay loam or clay loam to a depth of 20 inches, and is clay loam or light clay below this depth. The C horizon is silty clay or clay shale and ranges from slightly acid to moderately alkaline. The lower part of the B horizon and the C horizon are less acid than defined in the range for the series, but this difference does not alter the usefulness or behavior of the soils.

High Gap soils are on uplands, as are Hickory and Atlas soils. They have shale between depths of 20 and 40 inches, and Hickory or Atlas soils commonly do not. They are better drained than Atlas soils.

Hitt Variant

The Hitt series, shallow variant, consists of well-drained, nearly level to gently sloping soils on terraces. These soils formed in loamy sediment and in the under-

lying material weathered from limestone bedrock. The native vegetation was prairie grasses.

In a representative profile the surface layer is heavy loam about 14 inches thick. The upper 8 inches is very dark brown, and the lower 6 inches is very dark grayish brown and dark brown. The subsoil is mainly reddish brown and is about 16 inches thick. The upper 6 inches of it is clay loam, and the lower 10 inches is mainly sandy loam and some gravel. Limestone bedrock is at a depth of 30 inches.

These Hitt shallow variant soils are moderately permeable and have moderate available water capacity. Because the depth to bedrock is moderate, they are somewhat droughty. They are suited to all crops commonly grown in the county, but they are better suited to drought-resistant crops than to others.

Representative profile of Hitt loam, shallow variant, 0 to 4 percent slopes, 1,400 feet north and 295 feet west of the center of sec. 29, T. 19 N., R. 3 E.

Ap—0 to 8 inches, very dark brown (10YR 2/2) heavy loam; compact in place, parting to moderate, very fine and fine, granular structure; friable; some fine and medium gravel; mildly alkaline; abrupt, smooth boundary.

A3—8 to 14 inches, very dark grayish-brown (10YR 3/2) and dark-brown (7.5YR 3/2) heavy loam; moderate, fine and medium, granular structure; friable; some fine and medium gravel; mildly alkaline; clear, smooth boundary.

IIB2t—14 to 20 inches, reddish-brown (5YR 4/3) clay loam; moderately thick, discontinuous, dark reddish-gray (5YR 4/2) clay films on faces of peds; weak, medium, prismatic structure parting to moderate, medium, subangular blocky; friable; a few areas of very dark grayish brown (10YR 3/2) in root channels and on faces of peds; some gravel as much as 30 millimeters in diameter; mildly alkaline; clear, smooth boundary.

IIB31—20 to 27 inches, reddish-brown (5YR 4/4) heavy sandy loam; thin, patchy, reddish-brown (5YR 4/3) clay films on faces of peds; weak, fine and medium, subangular blocky structure; friable; some gravel as much as 30 millimeters in diameter; mildly alkaline; clear, smooth boundary.

IIB32—27 to 30 inches, dark-brown (7.5YR 4/4) loam; white (10YR 8/1) and yellowish-brown (10YR 5/6) chunks of segregated sand; weak, fine and medium, subangular blocky structure; friable; some gravel as much as 30 millimeters in diameter; moderately alkaline; slightly effervescent; abrupt, smooth boundary.

IIIR—30 to 60 inches, Devonian limestone bedrock.

The solum ranges from 20 to 40 inches in thickness, which corresponds to depth to limestone bedrock. The A horizon ranges from 10 to 20 inches in thickness. It ranges from silt loam to loam. The reddish B horizon ranges from 10 to 30 inches in thickness. It is typically loam or clay loam, but is silt loam that has thin layers of sand or sandy loam in some places. Gravel is common in most places.

Hitt loam, shallow variant, is on terraces, as are Millsdale and Raddle soils. It is better drained than Millsdale soils. It has limestone bedrock at a depth of 20 to 40 inches, which is not common in Raddle soils.

Hitt loam, shallow variant, 0 to 4 percent slopes (V506A).—In most places this soil is on terraces. Nearly level areas are toward the center of terraces, but gently sloping areas form the foot slopes of adjacent bluffs. Most areas are irregularly shaped and extend out from the bluffs onto more nearly level terraces. Most are less than 50 acres in size, but a few are more than 60 acres.

Included with this soil in mapping are areas of unproductive limestone bedrock that are indicated on the soil map by the symbol for rock outcrops.

This soil is droughty in most years. Roots penetrate mainly into the soil above the bedrock. The organic-matter content is moderate.

This soil is used mainly for the cultivated crops commonly grown, but if irrigated, it is suited to specialty crops. Capability unit IIs–1; woodland suitability group 3o1; wildlife group 1; recreation group 1.

Hoopeston Series

The Hoopeston series consists of nearly level, somewhat poorly drained soils on terraces. These soils formed in sandy deposits under native prairie grasses.

In a representative profile the surface layer is mainly very dark grayish-brown sandy loam about 15 inches thick. The subsoil is about 13 inches thick. The upper part of it is grayish-brown sandy loam mottled with brown, and the lower part is grayish-brown loamy sand mottled with brown. The underlying material is mainly brownish and grayish stratified sand, sandy loam, and loamy sand mottled with brown and strong brown.

Hoopeston soils are droughty. They are moderately rapidly permeable and have low available water capacity. They are better suited to drought-resistant crops than to most others.

Representative profile of Hoopeston sandy loam, 532 feet south along fence row from a point directly under power lines, and 108 feet east in the northwest corner of SW¼NE¼SE¼ sec. 20, T. 18 N., R. 1 E.

Ap—0 to 9 inches, very dark grayish-brown (10YR 3/2) sandy loam, grayish brown (10YR 5/2) dry; moderate, very fine, granular structure; very friable; strongly acid; abrupt, smooth boundary.

A3—9 to 15 inches, very dark grayish-brown (10YR 3/2) sandy loam, grading to brown to dark brown (10YR 4/3) in the lower part; weak, fine and medium, subangular blocky structure parting to moderate, very fine, granular; very friable; strongly acid; clear, smooth boundary.

B2—15 to 22 inches, grayish-brown (10YR 5/2) light sandy loam; few, fine, distinct, brown to dark-brown (7.5YR 4/4) and strong-brown (7.5YR 5/6) mottles; thin, patchy, very dark grayish-brown (10YR 3/2) organic coatings on faces of peds; weak, coarse, subangular blocky structure; very friable; some black (N 2/0) root channel fillings; strongly acid; gradual, smooth boundary.

B3—22 to 28 inches, grayish-brown (10YR 5/2) heavy loamy sand; few, fine, distinct, brown to dark-brown (7.5YR 4/4) and strong-brown (7.5YR 5/6) mottles; thin, patchy, very dark grayish-brown (10YR 3/2) and dark grayish-brown (10YR 4/2) organic coatings on faces of peds; weak, coarse, subangular blocky structure; very friable; many black (N 2/0) iron-manganese concretions throughout; strongly acid; clear, smooth boundary.

C—28 to 50 inches, dark-brown (10YR 3/3), light brownish-gray (10YR 6/2), and pale-brown (10YR 6/3), stratified sand, sandy loam, and loamy sand; few, fine, distinct, brown to dark-brown (7.5YR 4/4) and strong-brown (7.5YR 5/6) mottles; single grained; very friable; dark brown (10YR 3/3) is probably root residue; medium acid.

The solum ranges from 20 to 40 inches in thickness. The A horizon is 12 to 18 inches thick and ranges from sandy loam to fine sandy loam. The B horizon is 10 to 25 inches thick. The B2 horizon is sandy loam or fine sandy loam,

and the B3 horizon is sandy loam or loamy sand. The C horizon ranges from sand to sandy loam. It is medium acid to neutral.

Hoopeston soils are on terraces, as are Dickinson and Lawler soils. They are more poorly drained than Dickinson soils. They have more sand throughout the solum than Lawler soils.

Hoopeston sandy loam (172).—In most places this nearly level soil is in lower positions between other soils on terraces. Areas are irregularly shaped, and most are less than 10 acres in size.

Included with this soil in mapping are small areas of Lawler soils that have more clay in the subsoil, are somewhat more productive, and are less droughty than Hoopeston soils. Also included are minor areas that are sandier and more poorly drained, remain wet longer, and are less productive than Hoopeston soils.

This soil is droughty in dry periods. Occasionally the water table is high in this soil. The organic-matter content is moderate.

This soil is used mainly for the cultivated crops commonly grown, but if irrigated it is suited to specialty crops. Capability unit IIs–3; woodland suitability group 3o1; wildlife group 4; recreation group 5.

Joslin Series

The Joslin series consists of nearly level to moderately sloping, well-drained soils on terraces. These soils formed in dominantly silty material and in the underlying reddish, clayey deposits. The native vegetation was prairie grass.

In a representative profile the surface layer is mainly black silt loam about 14 inches thick. The subsoil is about 46 inches thick. The upper 14 inches of it is mainly brown to dark-brown silt loam, the next 20 inches is yellowish-brown silt loam, and the lower 12 inches is reddish-brown silty clay. The underlying material is grayish-brown silt loam that has brownish and yellowish mottles.

Joslin soils are moderately to moderately slowly permeable and have high available water capacity. They are well suited to all crops commonly grown in the county.

Representative profile of Joslin silt loam, 0 to 2 percent slopes, 273 feet southeast along field boundary from the southeastern corner of the public pavilion in the southwest corner of SE¼SW¼NE¼ sec. 8, T. 18 N., R. 1 E.

Ap—0 to 8 inches, black (10YR 2/1) silt loam, dark gray (10YR 4/1) dry; moderate, fine and medium, granular structure; friable; few sand grains; mildly alkaline; abrupt, smooth boundary.

A12—8 to 14 inches, very dark gray (10YR 3/1), black (10YR 2/1), and brown to dark-brown (10YR 4/3) silt loam; moderate, fine and medium, granular structure; friable; many sand grains; many pores; neutral; clear, smooth boundary.

B1—14 to 18 inches, brown to dark-brown (10YR 4/3), dark-brown (10YR 3/3), and very dark gray (10YR 3/1) silt loam; weak, fine and medium, subangular blocky structure; friable; root channels and fillings lined with black (10YR 2/1) organic coatings; few sand grains and an occasional pebble; many pores; many light-gray (10YR 7/1) dry, uncoated silt grains; slightly acid; clear, smooth boundary.

B21t—18 to 28 inches, brown to dark-brown (10YR 4/3) and some dark yellowish-brown (10YR 4/4) silt loam; thin, discontinuous, dark-brown (10YR 3/3) organic clay films on faces of peds; moderate, medium and coarse, subangular blocky structure; friable; some very dark grayish-brown (10YR 3/2) and very dark gray (10YR 3/1) root channel fillings and linings; few sand grains and pebbles; few worm casts; many pores; slightly acid; gradual, smooth boundary.

B22t—28 to 37 inches, yellowish-brown (10YR 5/4) and some dark yellowish-brown (10YR 4/4) silt loam; thin, discontinuous, brown to dark-brown (7.5YR 4/2) clay films on faces of peds; weak, medium, prismatic structure parting to moderate, medium and coarse, subangular blocky and angular blocky; firm; some root channels filled with black (10YR 2/1) organic fillings; many sand grains; many pores; medium acid; gradual, smooth boundary.

B31t—37 to 48 inches, yellowish-brown (10YR 5/4) silt loam; thin, discontinuous, brown to dark-brown (7.5YR 4/2) clay films on faces of peds; weak, coarse, prismatic structure; friable; some root and worm channels filled with black (10YR 2/1) organic material; many fine pores; some spots of reddish-brown (2.5YR 4/4) clay from below; slightly acid; clear, smooth boundary.

IIB32t—48 to 60 inches, reddish-brown (2.5YR 4/4) silty clay; thin, continuous, weak-red (2.5YR 4/2) clay films on faces of peds; moderate, medium and coarse, prismatic structure; firm and very firm; some root channels; some channels with brownish-yellow (10YR 6/6) fillings; few fine root channels contain black (10YR 2/1) fillings; neutral; abrupt, smooth boundary.

IIIC—60 to 85 inches, grayish-brown (10YR 5/2) and light brownish-gray (10YR 6/2) silt loam; many, fine, distinct, yellowish-brown (10YR 5/4 and 10YR 5/6) and brownish-yellow (10YR 6/6) mottles and common, fine, prominent, strong-brown (7.5YR 5/6) mottles; peds from IIB32t horizon finger about 3 inches into this horizon; the rest of horizon is massive; black (10YR 2/1) organic root linings and channels; few spots of reddish-brown (2.5YR 4/4) clay from IIB32t horizon; many fine pores; few iron-manganese concretions; moderately alkaline.

The solum ranges from 48 to 72 inches in thickness. The depth to the reddish IIB horizon ranges from 40 to 60 inches. The A horizon is 10 to 20 inches thick. It ranges from silt loam to loam and from black to dark brown. The upper part of the B horizon is 30 to 40 inches thick. It is silt loam or loam. The reddish clayey IIB horizon is 6 to 18 inches thick. It ranges from heavy silty clay loam to clay. The IIIC horizon is commonly silt loam, but is silty clay loam, loam, or clay loam and stratified sand and fine gravel in some profiles. The solum ranges from medium acid to mildly alkaline.

Joslin soils are on teraces, as are Raddle and Coyne soils. They have a clayey, reddish IIB horizon, and Raddles soils do not. They have less sand in the A horizon and upper part of the B horizon and more clay in the IIB horizon than Coyne soils.

Joslin silt loam, 0 to 2 percent slopes (763A).—This soil is in areas that have no apparent pattern and are irregularly shaped. Most areas are less than 15 acres in size, but a few are more than 50 acres. This soil has the profile described as representative of the series.

Included with this soil in mapping are soils similar to Joslin silt loam, but the surface layer is low in organic-matter content. Included are soils similar to Joslin silt loam, but have slowly permeable, reddish clayey deposits at a depth of 24 to 40 inches. Also included are a few places where drainage is somewhat poor. These areas remain wet longer after heavy rainfall.

This soil is moderate in organic-matter content.

This soil is used mainly for cultivated crops, but it is well suited to all crops commonly grown in the county. Capability unit I–1; woodland suitability group 2o1; wildlife group 1; recreation group 1.

Joslin silt loam, 2 to 6 percent slopes (763B).—This soil is on terrace ridges. Areas are elongated in the shape of the terrace, or are irregularly shaped and are in no apparent pattern. Most are less than 5 acres in size, but a few are more than 15 acres. The profile of this soil is similar to the one described as representative of the series, but the dark-colored surface layer is somewhat thinner.

Included with this soil in mapping are a few wet areas that are about 1 acre in size and are indicated on the soil map by a spot symbol. Included are soils similar to Joslin silt loam that have a surface layer low in organic matter content and other soils similar to Joslin silt loam that have slowly permeable, reddish clayey deposits at a depth of 24 to 40 inches. Also included are a few eroded, sloping soils that have sand between depths of 24 and 40 inches. These soils are more droughty than Joslin soils.

This Joslin soil is subject to erosion if slopes are improperly managed. The organic-matter content is moderate.

This soil is used mainly for cultivated crops, but is well suited to all crops commonly grown in the county. Capability unit IIe–1; woodland suitability group 2o1; wildlife group 1; recreation group 1.

Joy Series

The Joy series consists of somewhat poorly drained, nearly level soils on uplands. These soils formed in loess under native grass vegetation.

In a representative profile the surface layer is mainly very dark gray silt loam about 14 inches thick. The subsoil is silt loam about 34 inches thick. It is mainly grayish brown mottled with yellowish brown. The underlying material is light olive-gray silt loam mottled with yellowish brown and strong brown.

Joy soils are moderately permeable and have very high available water capacity. They are well suited to all crops commonly grown in the county.

Representative profile of Joy silt loam, 293 feet south along fence from corner post in quarter line and 277 feet east of north-south fence in the northwest corner of NW¼SW¼NE¼ sec. 30, T. 19 N., R. 3 E.

Ap—0 to 10 inches, very dark gray (10YR 3/1) silt loam; moderate, very fine and fine, granular structure; friable; slightly acid; clear, smooth boundary.

A3—10 to 14 inches, very dark gray (10YR 3/1) and dark grayish-brown (10YR 4/2) silt loam; moderate, fine and medium, granular structure; friable; slightly acid; gradual, smooth boundary.

B21—14 to 25 inches, dark grayish-brown (10YR 4/2) heavy silt loam; common, fine, distinct, yellowish-brown (10YR 5/4) mottles and common, fine, faint, grayish-brown (10YR 5/2) mottles; moderate, fine, subangular blocky structure; friable; many root channels; slightly acid; clear, smooth boundary.

B22—25 to 33 inches, grayish-brown (10YR 5/2) silt loam; common, fine, distinct, yellowish-brown (10YR 5/4) mottles; weak, medium, prismatic structure parting to moderate, medium, subangular blocky; friable; many dark grayish-brown (10YR 4/2) root channels; neutral; clear, smooth boundary.

B3—33 to 48 inches, grayish-brown (10YR 5/2) silt loam; common, medium, prominent, strong-brown (7.5YR 5/6) mottles and common, medium, distinct, yellowish-brown (10YR 5/4) mottles; weak and moderate, coarse, prismatic structure; friable; dark grayish-brown (10YR 4/2) root channels; neutral; gradual, smooth boundary.

C—48 to 60 inches, light olive-gray (5YR 6/2) silt loam; few, medium, prominent, strong-brown (7.5YR 5/6) and yellowish-brown (10YR 5/4) mottles; massive; dark grayish-brown (10YR 4/2) root channels; mildly alkaline.

The solum ranges from 40 to 60 inches in thickness. The silt loam A horizon is 12 to 18 inches thick. The silt loam B horizon ranges from 30 to 45 inches in thickness. The silt loam C horizon ranges from slightly acid to moderately alkaline.

Joy soils formed in thick loess, as did Port Byron and Muscatine soils. They are more poorly drained than Port Byron soils. They have less clay in their B horizon than Muscatine soils.

Joy silt loam (275).—In most places this nearly level soil is below and between dunes, mainly at the lowest position in the landscape. Natural drainageways are a part of these areas. Most areas are less than 10 acres in size, but a few are more than 75 acres.

Included with this soil in mapping are a few poorly drained soils that are about 1 acre in size and are indicated on the soil map by the symbol for wet spots. Also included are several less productive, sandy areas that are about 1 acre in size and are indicated on the soil map by a spot symbol.

Occasionally the water table is high in this soil. The organic-matter content is high.

This soil is used mainly for cultivated crops, but it is suited to all crops commonly grown in the county. Capability unit I–2; woodland suitability group 2o1; wildlife group 4; recreation group 5.

Lamont Series

The Lamont series consists of well-drained, moderately sloping to steep soils on uplands. These soils formed in sandy deposits under native timber vegetation.

In a representative profile the surface layer is very dark grayish-brown fine sandy loam about 4 inches thick. The subsurface layer is fine sandy loam about 7 inches thick. The upper part of it is very dark gray and brown, and the lower part is dark yellowish brown. The subsoil is 27 inches thick. The upper 17 inches of it is mainly brown fine sandy loam, and the lower 10 inches is yellowish-brown loamy fine sand. The underlying material is strong-brown fine sandy loam and stratified layers of yellow sand.

Lamont soils are moderately rapidly permeable and have low to moderate available water capacity. They are droughty and are better suited to drought-resistant crops than to most others.

Representative profile of Lamont fine sandy loam in an area of Lamont, Tell, and Bloomfield soils, 4 to 12 percent slopes, eroded, 10 feet north and 60 feet east of the southwest corner of sec. 8, T. 16 N., R. 5 W.

Ap—0 to 4 inches, very dark grayish-brown (10YR 3/2) fine sandy loam; compact in place parting to moderate, very fine and fine, granular structure; very friable; neutral; abrupt, smooth boundary.

A21—4 to 8 inches, brown (10YR 5/3) and very dark gray (10YR 3/1) fine sandy loam; moderate, thin, platy structure; very friable; slightly acid; abrupt, smooth boundary.

A22—8 to 11 inches, dark yellowish-brown (10YR 4/4) fine sandy loam; moderate, thin, platy structure; very friable; strongly acid; abrupt, smooth boundary.

B21t—11 to 18 inches, brown (7.5YR 5/4) fine sandy loam; thin, discontinuous, dark-brown (7.5YR 4/4) clay films on faces of peds; moderate, fine and medium, subangular blocky structure; friable; slightly acid; gradual, smooth boundary.

B22t—18 to 28 inches, strong-brown (7.5YR 5/6) fine sandy loam; thin, discontinuous clay films on faces of peds; moderate, medium and coarse, subangular blocky structure; friable; medium acid; clear, smooth boundary.

B3—28 to 38 inches, yellowish-brown (10YR 5/6) loamy fine sand; weak, coarse, subangular blocky and weak, fine, granular structure; very friable; medium acid; gradual, smooth boundary.

C—38 to 63 inches, strong-brown (7.5YR 5/6) fine sandy loam and layers of yellow (10YR 7/6) sand; fine sandy loam is massive and sand is single grained; very friable and loose; slightly acid.

The solum ranges from 24 to 40 inches in thickness. In undisturbed areas the A horizon is fine sandy loam or sandy loam and ranges from 5 to 15 inches in thickness. In some undisturbed areas the A1 horizon is less than 6 inches thick and ranges from very dark gray (10YR 3/1) to very dark grayish brown (10YR 3/2). The B horizon is 12 to 30 inches thick. The B2 horizon ranges from fine sandy loam to sandy loam, and the B3 horizon is sandy loam or loamy sand. The C horizon ranges from sand to sandy loam and from strongly acid to neutral.

Lamont soils are associated with Tell and Bloomfield soils. Lamont soils have more sand and less clay than Tell soils and less sand and more clay than Bloomfield soils. Lamont soils commonly do not have the clay-iron bands characteristic to Bloomfield soils.

Lamont, Tell, and Bloomfield soils, 4 to 12 percent slopes, eroded (947C2).—In most places this mapping unit is on crowns of large dunes or makes up entire small dunes. It is about 40 percent Lamont fine sandy loam, about 35 percent Tell silt loam, and about 25 percent Bloomfield fine sand. These soils are in a random pattern in the landscape. In places Tell or Lamont soils are at the crest of the dunes, and Bloomfield or Lamont soils are on the sides of dunes. In other places Bloomfield soils occupy the crests, but Tell soils are on one side of the dune and Lamont or Bloomfield soils are on the other side. Most areas are less than 20 acres in size, but a few are more than 80 acres. The profile of the Lamont soil is the one described as representative of the Lamont series.

Included with these soils in mapping are a few areas of more productive Seaton soils and Seaton, sandy substratum soils. Some severely eroded areas that are less than 1 acre in size are indicated on the soil map by a spot symbol. These areas have increased runoff, undesirable tilth, and very low organic-matter content. Included are a few poorly drained soils between dunes that are less than 1 acre in size and are indicated on the soil map by the symbol for wet spots. A few moderately steep to steep areas where slopes are narrow are indicated on the soil map by the symbol for escarpments. Most of these areas are less than 1 acre in size. Also included are several sandpits that are indicated on the soil map by a spot symbol.

These soils are subject to severe water erosion and soil blowing if slopes are improperly managed. They are droughty during seasonally dry periods. The organic-matter content is low.

These soils are used mainly for the cultivated crops commonly grown and for permanent pasture, but if irrigated they are suited to specialty crops. Capability unit IIIe–2; woodland suitability group 3s2; wildlife group 7; recreation group 3.

Lamont, Tell, and Bloomfield soils, 12 to 30 percent slopes, eroded (947F2).—In most places this mapping unit is on sides of some dunes or on side slopes of the dissected sandy uplands. It is about 40 percent Lamont fine sandy loam, about 40 percent Tell silt loam, and about 20 percent is Bloomfield fine sand. These soils are in a random pattern in the landscape and alternate irregularly within the mapping unit. On some dunes, Tell soils are near the top and also near the lower part of the slope. Lamont and Bloomfield soils are in the middle of the slope and alternate irregularly. On slopes caused by erosional dissection, the pattern of the soils is unpredictable. Drainageways are eroded; most of the overlying silty material is missing, and sand is exposed. Lamont and Bloomfield soils are in these drainageways. In some places Tell soils are at the extreme top of the slope, and in other areas they are in slump areas below Lamont and Bloomfield soils. Most areas are less than 10 acres in size, but a few are more than 60 acres. The Bloomfield and Tell soils have the profiles described as representative of their series, but the profile of the Lamont soil has a thinner subsoil than the representative profile.

Included with these soils in mapping are a few areas of poorly drained soils between the dunes. They are about 1 acre in size and are indicated on the soil map by a wet spot symbol.

These soils are subject to severe water erosion and soil blowing if slopes are improperly managed. They are droughty during seasonally dry periods. The organic-matter content is low.

These soils are used mainly for pasture or woodland and less commonly for cultivated crops. The slope and erosion hazards, however, limit suitability chiefly to permanent plant cover. Capability unit VIs–1; woodland suitability group 3s3; wildlife group 7; recreation group 4.

Landes Series

The Landes series consists of well-drained, nearly level to gently sloping soils on bottom lands. These soils formed mainly in sandy alluvium.

In a representative profile the surface layer is dark-brown loamy fine sand about 10 inches thick. In sequence from the top the underlying material is 19 inches of stratified, light yellowish-brown and yellowish-brown loamy sand and loamy fine sand; 10 inches of mainly grayish-brown loam; and 21 inches of stratified, pale-brown and light yellowish-brown loamy sand and sand.

Landes soils are moderately rapidly to rapidly permeable and have moderate to low available water capacity. They are droughty and are better suited to drought-resistant crops than to most others.

Representative profile of Landes loamy fine sand, 285 feet northeast of centerline of Illinois Route 92 along

middle of grassed lane, and 70 feet southeast at right angle to lane in the northwest corner of SW¼SW¼-NW¼ sec. 1, T. 16 N., R. 6 W.

A1—0 to 10 inches, dark-brown (10YR 3/3) loamy fine sand, brown (10YR 5/3) dry; weak, very fine, granular structure; very friable; neutral; abrupt, smooth boundary.

C1—10 to 26 inches, light yellowish-brown (10YR 6/4) loamy sand, very pale brown (10YR 7/3) dry; single grained; slightly acid; abrupt, smooth boundary.

C2—26 to 29 inches, yellowish-brown (10YR 5/4) and light yellowish-brown (10YR 6/4) loamy fine sand; weak, very fine, granular structure; very friable; neutral; clear, smooth boundary.

C3—29 to 39 inches, grayish-brown (10YR 5/2) and dark grayish-brown (10YR 4/2) loam; common, medium, faint, brown (10YR 4/3) mottles; weak, fine and medium, subangular blocky structure; friable; slightly acid; clear, smooth boundary.

C4—39 to 42 inches, pale-brown (10YR 6/3) loamy sand, very pale brown (10YR 7/3) dry; weak, very fine, granular structure; very friable; slightly acid; abrupt, smooth boundary.

C5—42 to 60 inches, light yellowish-brown (10YR 6/4) sand, very pale brown (10YR 8/3) dry; single grained; loose; neutral.

The solum and the A horizon range from 10 to 20 inches in thickness and are neutral or mildly alkaline. The A horizon ranges from loamy fine sand to sandy loam. The stratified layers of the C horizon range from sand to silt loam. They range from slightly acid to moderately alkaline.

Because these soils are stratified in the C horizon, they are not in the defined range for the series, but this difference does not alter the usefulness or behavior of the soils.

Landes soils are on bottom lands, as are Coffeen and Radford soils. They are better drained and have appreciably more sand than Coffeen and Radford soils. They do not have the dark-colored buried silty clay loam soil typical of Radford soils.

Landes loamy fine sand (304).—This nearly level to gently sloping soil is on flood plains. Most areas are close to and are associated with the Mississippi and Rock Rivers. They are at a somewhat higher position in the landscape than surrounding soils. Areas are somewhat long and narrow and tend to parallel the river. Most are less than 10 acres in size, but a few are more than 50 acres.

Included with this soil in mapping are a few sandy, somewhat poorly drained areas where the water table is near the surface part of the year. Also included is a soil that has a silty clay loam layer at a depth below 40 inches. This soil is more productive than Landes soils because it has higher available water capacity.

This Landes soil is subject to flooding on unprotected bottom lands. The organic-matter content is very low.

This soil is used mainly for cultivated crops and urban development. It is droughty and not well suited to crops commonly grown in the county. It is suited to urban development in areas that are protected and not subject to flooding. Capability unit IVs–1; woodland suitability group 2o4; wildlife group 5; recreation group 6.

Lawler Series

The Lawler series consists of nearly level, somewhat poorly drained soils on terraces. These soils formed in loamy material and in the underlying sandy deposit under native prairie vegetation.

In a representative profile the surface layer is mainly black heavy loam about 15 inches thick. The subsoil, about 18 inches thick, is dark grayish brown and has brownish mottles. The upper 13 inches of it is light sandy clay loam, and the lower 5 inches is heavy loamy sand. The underlying material is yellowish-brown medium and coarse sand and fine gravel.

Lawler soils are moderately permeable and have moderate available water capacity. They are suited to all crops commonly grown in the county, but they are somewhat droughty and are better suited to drought-resistant crops.

Representative profile of Lawler loam, 395 feet east of centerline of ditch, and 17 feet south of east-west fence in the northeast corner of NW¼SE¼SE¼ sec. 10, T. 20 N., R. 2 E.

Ap—0 to 10 inches, black (10YR 2/1) heavy loam; weak, medium, subangular blocky structure parting to moderate, very fine and fine, granular; friable; medium acid; clear, smooth boundary.

A3—10 to 15 inches, black (10YR 2/1) and dark grayish-brown (10YR 4/2) heavy loam; few, fine, faint, dark yellowish-brown (10YR 4/4) mottles; weak, coarse, subangular blocky structure; firm; medium acid; clear, smooth boundary.

B2—15 to 28 inches, dark grayish-brown (10YR 4/2) and some dark-gray (10YR 4/1) light sandy clay loam; many, fine, distinct, dark yellowish-brown (10YR 4/4), yellowish-brown (10YR 5/4), and dark-brown and brown (7.5YR 4/4) mottles; moderate, coarse, subangular blocky structure; friable; medium acid; gradual, smooth boundary.

IIB3—28 to 33 inches, dark grayish-brown (10YR 4/2) heavy loamy sand; many, fine, distinct, dark yellowish-brown (10YR 4/4), yellowish-brown (10YR 5/4), and dark-brown and brown (7.5YR 4/4) mottles; weak, coarse, subangular blocky structure; friable; medium acid; clear, smooth boundary.

IIC—33 to 60 inches, yellowish-brown (10YR 5/4) medium and coarse sand and fine gravel; single grained; medium acid.

The solum ranges from 24 to 40 inches in thickness. The A horizon ranges from 12 to 18 inches in thickness and ranges from loam to silt loam. The loamy upper part of the B horizon ranges from loam to sandy clay loam, and it is 15 to 25 inches thick. In some places a IIB horizon occurs that is sandy loam or loamy sand. The IIC horizon ranges from gravelly loamy sand to sand and fine gravel.

Lawler soils are on terraces, as are Hoopeston and Waukee soils. They have less sand in their solum than Hoopeston soils. They are more poorly drained than Waukee soils.

Lawler loam (647).—In most places this nearly level soil is in lower, irregularly shaped areas between other soils. Most areas are less than 5 acres in size, but a few are more than 15 acres.

Included with this soil in mapping are small areas of Hoopeston soils that have more sand in the subsoil, are somewhat less productive, and are more droughty than Lawler soils.

This soil is somewhat droughty in dry periods. Occasionally the water table is high. The organic-matter content is moderate.

This soil is used mainly for the cultivated crops commonly grown in the county, but if irrigated it is suited to specialty crops. Capability unit IIs–3; woodland

suitability group 3o1; wildlife group 4; recreation group 5.

Lawson Series

The Lawson series consists of somewhat poorly drained, nearly level soils on bottom lands. These soils formed in silty alluvium.

In a representative profile the surface layer extends to a depth of 55 inches. The upper 6 inches is very dark gray silt loam, the next 40 inches is mainly black silt loam, the next 4 inches is black silty clay loam, and the lower 5 inches is very dark gray silt loam. The underlying material is grayish silty clay loam that has brownish mottles.

Lawson soils are moderately permeable and have very high available water capacity. They are well suited to all crops commonly grown in the county.

Representative profile of Lawson silt loam, 557 feet south of center of road along fence, and 154 feet east of fence in the southwest corner of NW¼NE¼NE¼ sec. 25, T. 16 N., R. 1 W.

Ap—0 to 6 inches, very dark gray (10YR 3/1) silt loam, dark gray (10YR 4/1) and grayish brown (10YR 5/2) dry; moderate, very fine and fine, granular structure; friable; mildly alkaline; abrupt, smooth boundary.

A12—6 to 12 inches, black (10YR 2/1) and very dark gray (10YR 3/1) silt loam; moderate, medium, subangular blocky structure parting to moderate, fine and medium, granular; friable; slightly acid; clear, smooth boundary.

A13—12 to 34 inches, black (10YR 2/1) silt loam; moderate, medium, subangular blocky structure parting to moderate, fine and medium, granular; friable; few dark-brown (10YR 3/3) organic stains; slightly acid; clear, smooth boundary.

A14—34 to 46 inches, black (10YR 2/1) silt loam; moderate, medium, subangular blocky structure parting to moderate, fine and medium, granular and slight tendency toward prismatic; friable; few dark-brown (10YR 3/3) organic stains; neutral; clear, smooth boundary.

A15—46 to 50 inches, black (10YR 2/1) light silty clay loam; moderate, medium, prismatic structure parting to moderate, medium, subangular blocky; firm; mildly alkaline; clear, smooth boundary.

A16—50 to 55 inches, very dark gray (10YR 3/1) heavy silt loam; moderate, medium, prismatic structure parting to moderate, medium, subangular blocky; friable; mildly alkaline; abrupt, smooth boundary.

Cg—55 to 60 inches, gray to light-gray (5Y 6/1) light silty clay loam; few, fine, prominent, dark yellowish-brown (10YR 4/4) mottles; massive; mildly alkaline.

The A horizon commonly ranges from 36 to 48 inches in thickness but, in places, ranges from 24 to 60 inches. It is black or very dark gray. It is mainly silt loam, but it is individual thin layers of silty clay loam in places. The C horizon is mainly silt loam, but it is stratified layers of silty clay loam, clay loam, loam, sandy loam, or sand in places. The soils range from slightly acid to alkaline.

Lawson soils are on bottom lands, as are Radford and Coffeen soils. They do not have the dark-colored silty clay loam buried horizon characteristic of Radford soils. They have a thicker dark-colored A horizon than Coffeen soils.

Lawson silt loam (451).—This nearly level soil is on flood plains. Most areas are on narrow bottom lands that extend from broader flood plains onto prairie uplands. A few are within broad flood plains of major rivers and creeks. Most areas are less than 20 acres in size, but a few are more than 180 acres.

Included with this soil in mapping are less productive sandy areas about an acre in size that are indicated on the soil map by a spot symbol. A few wet areas, about an acre in size, are indicated on the soil map by a spot symbol. Also included are some areas, about 1 acre in size, where slopes are short and narrow. These areas are indicated on the soil map by the symbol for escarpments.

This soil is subject to flooding on unprotected bottom lands. Occasionally the water table is high. The organic-matter content is high.

This soil is used mainly for cultivated crops and is suited to this use. The degree of suitability for any use in areas subject to overflow depends on the frequency and duration of flooding. Capability unit I–3; woodland suitability group 2o4; wildlife group 5; recreation group 6.

Marsh

Marsh (718) in many places is in low depressions that do not have material drainage outlets. Areas are covered with water for long periods. Most areas are in long and narrow sloughs. Some are parallel and adjacent to large bodies of water. Most are less than 20 acres in size, but a few are more than 80 acres. Marsh is mainly silty alluvium and organic material.

Most areas are used as habitat for wetland wildlife and are well suited to this use. Capability unit unassigned; woodland suitability group unassigned; wildlife group 6; recreation group 8.

Martinsville Series

The Martinsville series consists of well-drained, gently sloping to moderately steep soils on terraces and moderately sloping to steep soils on uplands. These soils formed in loamy outwash under native timber vegetation.

In a representative profile the surface layer is very dark grayish-brown loam about 3 inches thick. The subsurface layer is dark grayish-brown and brown loam about 9 inches thick. The subsoil is about 30 inches thick. The upper 16 inches of it is yellowish-brown loam and light clay loam, the next 8 inches is yellowish-brown clay loam, and the lower 6 inches is yellowish-brown silty clay loam mottled with light gray. The underlying material is yellowish-brown, gray, brown, and strong brown, stratified silt loam, loam, sandy loam, sand, clay loam, and silty clay loam.

Martinsville soils are moderately permeable and have high available water capacity. They are suited to the cultivated crops commonly grown if erosion is adequately controlled. Some slopes are too steep for row crops and are better suited to grasses, legumes, or trees.

Representative profile of Martinsville silt loam, 2 to 7 percent slopes, 600 feet north of south section line along blacktop road and 68 feet west of center of New Boston blacktop road on north side of ditchbank in the SE¼NW¼SW¼ sec. 7, T. 16 N., R. 5 W.

A1—0 to 3 inches, very dark grayish-brown (10YR 3/2) loam, gray (10YR 6/1) dry; moderate, very fine and fine, granular structure; friable; medium acid; clear, smooth boundary.

A21—3 to 8 inches, dark grayish-brown (10YR 4/2) and some brown (10YR 4/3) loam; weak, very thin, platy structure; friable; medium acid; clear, boundary.

A22—8 to 12 inches, brown (10YR 4/3) and some dark grayish-brown (10YR 4/2) loam; weak, thin, platy structure; friable; few pebbles; slightly acid; clear, smooth boundary.

B1—12 to 18 inches, yellowish-brown (10YR 5/6) loam; moderate, fine, subangular and angular blocky structure; friable; few pebbles; slightly acid; clear, smooth boundary.

B21t—18 to 28 inches, yellowish-brown (10YR 5/6) light clay loam; moderately thick, discontinuous, dark yellowish-brown (10YR 4/4) clay films on faces of peds; moderate, medium, subangular and angular blocky structure; friable; few pebbles; medium acid; clear, smooth boundary.

B22t—28 to 36 inches, yellowish-brown (10YR 5/4) clay loam; moderately thick, discontinuous, dark-brown (7.5YR 4/4) and dark yellowish-brown (10YR 4/4) clay films on faces of peds; few, fine and medium, distinct, gray (5Y 6/1) mottles; moderate, medium, subangular and angular blocky structure; friable; few pebbles; strongly acid; clear, smooth boundary.

B3t—36 to 42 inches, yellowish-brown (10YR 5/4) silty clay loam and some sand; moderately thick, discontinuous, dark-brown (7.5YR 4/4) and dark yellowish-brown (10YR 4/4) clay films on faces of peds; many, fine and medium, distinct, light-gray (10YR 6/1) mottles; weak, medium and coarse, subangular and angular blocky structure; friable; few pebbles; few black (10YR 2/1) iron-manganese concretions; strongly acid; clear, smooth boundary.

C—42 to 60 inches, yellowish-brown (10YR 5/4), gray (10YR 5/1), brown (7.5YR 5/4), and strong-brown (7.5YR 5/6), stratified silt loam, loam, sandy loam, sand, clay loam, and silty clay loam; massive; 1-inch stone line at a depth of 50 inches; medium acid.

The solum ranges from 40 to 60 inches in thickness. The undisturbed A horizon ranges from loam to silt loam and is 5 to 12 inches thick. In some undisturbed areas an A1 horizon is less than 6 inches thick and is very dark gray (10YR 3/1) or very dark grayish brown (10YR 3/2). The B horizon ranges from 30 to 50 inches in thickness. It is mainly stratified clay loam and loam, but ranges to individual layers of silty clay loam and sandy loam. The C horizon is commonly stratified silt loam, loam, and sandy loam, but is thin layers of sand, loamy sand, clay loam, or silty clay loam in places. It is medium or slightly acid.

Martinsville soils have good internal drainage, as do Rozetta and Raddle soils. They have more sand and less silt in their B horizon than Rozetta soils that formed in loess. They have more clay and more sand in their B horizon than Raddle soils. They have a lighter colored or a thinner dark-colored A horizon than Raddle soils.

Martinsville silt loam, 2 to 7 percent slopes (570B).—In most places this soil is below hills and adjacent to flood plains. In a few places, it is at the upper ends of upland valleys. Most areas are irregularly shaped, but some are long and narrow on benches adjacent to bluffs. These benches are several to many feet higher in elevation than areas of associated, lower lying alluvial soils. Most areas are less than 10 acres in size, but a few are more than 30 acres. This soil has the profile described as representative of the series.

Included with this soil in mapping in or near some urban areas are Martinsville soils that do not have the original surface layer. Interpretations for these areas are based mainly on subsoil characteristics. Included are a few acres of nearly level Martinsville soils that are not subject to erosion and some moderately sloping, eroded areas. Also included are severely eroded areas that are less than 1 acre in size and are indicated on the soil map by a spot symbol. Because these areas are eroded, runoff is increased, tilth is poor, and organic-matter content is lower.

This soil is subject to erosion if slopes are improperly managed. The organic-matter content is moderately low.

This soil is used mainly for cultivated crops, but is suited to all crops commonly grown in the county. Capability unit IIe–1; woodland suitability group 2o1; wildlife group 1; recreation group 1.

Martinsville soils, 7 to 12 percent slopes, severely eroded (570D3).—In most places these soils are on short sides or at upper ends of upland valleys below less sloping ridgetops. A few areas are on short sides of terrace benches. Most areas are less than 5 acres in size, but a few are more than 10 acres. The profiles of these soils are similar to the one described as representative of the series, but the surface layer is mainly the yellowish-brown loam to clay loam subsoil.

Included with these soils in mapping are less productive, sandy areas that are about 1 acre in size and are indicated on the soil map by a spot symbol. Included are some areas, about an acre in size, where slopes are short and narrow. These areas are indicated on the soil map by the symbol for escarpments. Also included are small areas of Martinsville soils where the surface layer is less eroded and tilth is better.

These severely eroded soils are subject to further erosion if slopes are improperly managed. Runoff is high, and infiltration is slow. Most of the original surface layer is missing, and, as a result, tilth is poor and organic-matter content is very low.

These soils are or have been used mainly for cultivated crops and pasture. The severe erosion, however, limits their suitability mainly to grasses and legumes or trees. Capability unit IVe–1; woodland suitability group 2o1; wildlife group 1; recreation group 3.

Martinsville soils, 12 to 18 percent slopes, severely eroded (570E3).—In most places these soils are on sides or at upper ends of upland valleys between less sloping ridgetops and nearly level bottom lands or drainageways. Most areas are less than 5 acres in size, but a few are more than 15 acres. The profiles of these soils are similar to the one described as representative of the series, but the surface layer is mainly the yellowish-brown loam to clay loam subsoil.

Included with these soils in mapping are some areas, about 1 acre in size, where slopes are sharp and narrow. These areas are indicated on the soil map by the symbol for escarpments. Less productive sandy areas that are about 1 acre in size are indicated on the soil map by the symbol for sand spots. Also included are small areas of Martinsville soils where the surface layer is less eroded and tilth is better and areas of steep Martinsville soils where shale or sandstone crops out. These less productive areas are indicated on the soil map by the symbol for rock outcrops.

These severely eroded Martinsville soils are subject to further erosion if slopes are improperly managed.

Runoff is rapid, and infiltration is slow. Most of the original surface layer is missing, and, as a result, tilth is poor and organic-matter content is very low.

These soils are or have been used mainly for cultivated crops and pasture. The severe erosion and moderately steep slopes, however, limit their suitability to grasses and legumes or trees. Capability unit VIe–1; woodland suitability group 1r2; wildlife group 2; recreation group 4.

Millington Series

The Millington series consists of nearly level, poorly drained soils on bottom lands. These soils formed in stratified loamy alluvium. The content of lime is high.

In a representative profile the surface layer is about 9 inches thick. It is very dark grayish-brown and very dark gray silt loam that has many shell fragments. The subsoil is about 20 inches thick. It is mainly very dark gray silt loam that has common sand grains, dark yellowish-brown mottles, and few broken snail and clam shells. The underlying material to a depth of 40 inches is dark-gray silt loam that has brownish mottles and many snail shells. Below this depth it is mainly brownish sand.

Millington soils are moderately permeable and have high available water capacity. The high content of lime is caused by snail and clam shells. The soils are better suited to crops tolerant of a seasonally high water table and high lime content than to most others.

Representative profile of Millington silt loam, 77 feet north of third power pole north of east-west drainage ditch along middle of road, and 71 feet west in the southeast corner of NE¼NW¼NE¼ sec. 14, T. 16 N., R. 6 W.

Ap—0 to 9 inches, very dark grayish-brown (10YR 3/2) and very dark gray (10YR 3/1) silt loam; moderate, fine and medium, granular structure; friable; many shell fragments on surface; moderately alkaline; strongly effervescent; abrupt, smooth boundary.

B2—9 to 22 inches, very dark gray (10YR 3/1) heavy silt loam and common sand grains; few, fine, distinct, dark yellowish-brown (10YR 3/4) mottles; compact, weak, medium and coarse, blocky structure parting to moderate, fine and medium, granular; friable; mildly alkaline; slightly effervescent; clear, smooth boundary.

B3—22 to 29 inches, very dark gray (10YR 3/1) and very dark grayish-brown (10YR 3/2) silt loam and common sand grains; common, fine, distinct, dark yellowish-brown (10YR 3/4) mottles; compact, weak, medium and coarse, blocky structure parting to moderate, fine and medium, granular; friable; few broken snail and clam shells; moderately alkaline; strongly effervescent; clear, smooth boundary.

C11g—29 to 40 inches, dark-gray (10YR 4/1) silt loam; few, fine, distinct, dark-brown (10YR 3/3) and dark yellowish-brown (10YR 3/4) mottles; massive; few fine strata of sandy loam; many snail shells; moderately alkaline; strongly effervescent; clear, smooth boundary.

IIC12g—40 to 50 inches, mainly brown (10YR 5/3) and dark reddish-brown (5YR 3/3) sand that tends to be stratified; single grained; mildly alkaline; clear, smooth boundary.

IIC13g—50 to 60 inches, mainly dark greenish-gray (5G 4/1) and dark brown (7.5YR 3/2) sand that tends to be stratified; single grained; mildly alkaline.

The solum has free carbonates and ranges from 24 to 40 inches in thickness. It ranges from black to very dark grayish brown. It is commonly silt loam, but is stratified loam, silt loam, silty clay loam, clay loam, or sandy loam in places. The stratified, gleyed C horizon has layers of silt loam, loam, clay loam, sandy loam, or sand. It is mildly alkaline or moderately alkaline. In places it has free carbonates.

Millington soils are on bottom lands, as are Calco and Otter soils. They have more sand and less clay than Calco soils and more sand than Otter soils. The content of lime is high in Millington soils, which is not characteristic of Otter soils.

Millington silt loam (82).—In most places this nearly level soil is in areas within broad flood plains or is adjacent to rivers or creeks. These areas are irregularly shaped in most places but some tend to be somewhat long and narrow. In most places the soil is at one of the lowest positions in the landscape. Most areas are less than 10 acres in size, but a few are more than 120 acres. This soil has the profile described as representative of the series.

Included with this soil in mapping are less productive sandy areas that are about an acre in size and are indicated on the soil map by the symbol for sand spots.

Frequently the water table is high in this soil. Flooding is a hazard on unprotected bottom lands. The organic-matter content is high. The high content of lime decreases the amount of available phosphorus.

This soil is used mainly for cultivated crops or pasture. It is better suited to crops tolerant of a seasonally high water table and a high lime content than to most others. Some areas have been converted to woodland. The degree of suitability for any use in areas subject to overflow depends on the frequency and duration of flooding. Capability unit IIw–2; woodland suitability group 2w5; wildlife group 6; recreation group 8.

Millington silt loam, wet (W82).—In most places this nearly level soil is in depressions. Some areas are in long and narrow sloughs that lack natural drainage outlets. Others lie outside of levees adjacent and parallel to rivers or creeks. Most areas are less than 20 acres in size, but a few are more than 100 acres.

Included with this soil in mapping are a few areas of Marsh that are less than 1 acre in size.

This soil has a permanently high water table. Ponding is a hazard. The organic-matter content is high. The high content of lime decreases the amount of available phosphorus.

Most areas of this soil are idle, but some areas are used for permanent pasture or woodland. The degree of suitability for any use depends on the frequency and duration of ponding. Capability unit Vw; woodland suitability group 2w5; wildlife group 6; recreation group 8.

Millsdale Series

The Millsdale series consists of poorly drained, nearly level soils on terraces. These soils formed in water-deposited sediment on limestone bedrock. The native vegetation was prairie grass.

In a representative profile the surface layer is black silty clay loam about 15 inches thick that contains a

few pebbles. The subsoil is 12 inches thick. The upper 8 inches of it is black silty clay and some pebbles, and the lower 4 inches is dark-gray silty clay loam that has yellowish-brown mottles and a few pebbles and rock fragments. White limestone bedrock is at a depth of 27 inches.

Millsdale soils are slowly to moderately slowly permeable and have moderate available water capacity.

These soils are better suited to plants that need only a shallow root zone than to most others. Those selected need to be tolerant of a seasonally high water table.

Representative profile of Millsdale silty clay loam, 220 feet north from west corner post in east-west fence, and 225 feet east from the center of road into permanent pasture in the southwest corner of NW¼-SE¼NE¼ sec. 30, T. 19 N., R. 3 E.

Ap—0 to 8 inches, black (N 2/0) light silty clay loam; common sand grains and few small pebbles; compact in place parting to moderate, very fine and fine, granular structure; friable; mildly alkaline; abrupt, smooth boundary.

A12—8 to 15 inches, black (N 2/0) silty clay loam; few sand grains and small pebbles; moderate, fine and medium, granular structure; friable; mildly alkaline; clear, smooth boundary.

B21tg—15 to 23 inches, black (N 2/0) silty clay; few sand grains and small and large pebbles; thin, discontinuous, very dark gray (N 3/0) organic films on all faces of peds; moderate, fine and medium, subangular blocky structure; firm; mildly alkaline; clear, smooth boundary.

B22tg—23 to 27 inches, dark-gray (10YR 4/1) silty clay loam; common sand grains and few pebbles and rock fragments; common, fine, distinct, yellowish-brown (10YR 5/4) mottles; moderate, fine and medium, subangular blocky structure; firm; mildly alkaline; abrupt, smooth boundary.

IIR—27 to 60 inches, white (10YR 8/1) Devonian limestone; moderately alkaline; strongly effervescent.

The solum ranges from 20 to 40 inches in thickness, which corresponds to the thickness of the soil over limestone bedrock. The A horizon ranges from 10 to 20 inches in thickness. It ranges from silty clay loam to silty clay. The B horizon ranges from 10 to 30 inches in thickness. It ranges from heavy silty clay loam or heavy clay loam to silty clay or clay.

Millsdale soils are on terraces, as are Montgomery and Hitt shallow variant soils. They have limestone bedrock at a depth of 20 to 40 inches, which is not characteristic of Montgomery soils. They have more clay in their solum and are more poorly drained than Hitt shallow variant soils.

Millsdale silty clay loam (317).—This nearly level soil is on terraces. Shape of areas is irregular and corresponds to the underlying bedrock that is within a depth of 40 inches. Most areas are less than 40 acres in size, but a few are more than 80 acres.

Included with this soil in mapping are some areas, about 1 acre in size, where slopes are short and narrow. These areas are indicated on the soil map by the symbol for escarpments. A few areas where bedrock is at a depth of about 10 to 20 inches are included in mapping. Also included are areas where bedrock outcrops. These areas are indicated on the soil map by the symbol for rock outcrop.

Frequently the water table is high in this soil. In some places flooding is a hazard. The high content of clay in the surface layer causes very poor workability. The organic-matter content is high.

This soil is used mainly for cultivated crops or pasture, but a few areas are used for urban development. It is better suited to uses not limited by a seasonally high water table or the presence of limestone bedrock than to most others. Capability unit IIIw–1; woodland suitability group 2w3; wildlife group 6; recreation group 7.

Mixed Alluvial Land

Most areas of Mixed alluvial land (455) are on nearly level islands and in areas outside of levees adjacent and parallel to the Mississippi and Rock Rivers. Other areas are in nearly level to moderately sloping colluvial positions that separate uplands from bottom lands. Most areas are less than 30 acres in size, but a few are more than 300 acres.

This land type is made up of alluvial or colluvial soils. It is about 35 percent Dorchester silt loam, about 15 percent Raddle silt loam, and 50 percent Coffeen silt loam, Lawson silt loam, Landes loamy sand, Millington silt loam, and Otter silt loam. Within a given area the surface layer ranges from dark colored to light colored and from sand to silt loam, and the underlying material ranges from sand to clay loam or silty clay loam. Internal drainage ranges from poor to good. Shale fragments lie on or are mixed into the soil in many places.

Most of these soils are moderately permeable and have high available water capacity, but Landes loamy sand is more permeable and has lower available water capacity. The organic-matter content ranges from low to high.

Low-quality trees grow in most nearly level areas. Because areas can not practically be protected from flooding, they are better suited as wildlife habitat. The nearly level to moderately sloping areas are subject to frequent overflow from sandy and loamy uplands. Capability unit IIIw–2; woodland suitability group 2o4; wildlife group 5; recreation group 6.

Montgomery Series

The Montgomery series consists of very poorly drained, nearly level soils on terraces. These soils formed in black and grayish clayey deposits and in the underlying, reddish, clayey sediment.

In a representative profile the surface layer is about 21 inches thick. The upper 8 inches of it is very dark gray silty clay loam, the next 6 inches is black silty clay loam, and the lower 7 inches is very dark gray light silty clay. The subsoil is about 43 inches thick. The upper 25 inches of it is mainly dark-gray light silty clay mottled with reddish brown, and the lower 18 inches is mainly reddish-brown clay. The underlying material is light-gray to gray light silty clay loam.

Montgomery soils are slowly to very slowly permeable and have moderate available water capacity. They are better suited to crops tolerant of a seasonally high water table and a clayey subsoil than to most others.

Representative profile of Montgomery silty clay loam, 175 feet south of east-west road fence, and 23

feet east of north-south fence in the northwest corner of NW¼NW¼NE¼ sec. 29, T. 17 N., R. 2 W.

Ap—0 to 8 inches, very dark gray (N 3/0) silty clay loam; moderate, fine and medium, subangular blocky and angular blocky structure parting to weak, fine and medium, granular; firm; mildly alkaline; abrupt, smooth boundary.

A12—8 to 14 inches, black (N 2/0) medium silty clay loam; moderate, fine and medium, granular structure; friable; mildly alkaline; clear, smooth boundary.

A13—14 to 21 inches, very dark gray (N 3/0) light silty clay; weak, fine and medium, angular blocky and subangular blocky structure parting to moderate, fine and medium, granular; friable; mildly alkaline; clear, smooth boundary.

B21g—21 to 34 inches, dark-gray (N 4/0 and 5Y 4/1) light silty clay; common, fine, distinct, brown to dark-brown (7.5YR 4/4) mottles; moderate, medium, prismatic structure parting to weak, fine and medium, subangular blocky; firm; mildly alkaline; clear, smooth boundary.

B22g—34 to 46 inches, gray (5Y 5/1) and a variegated pattern of dark reddish-brown (2.5YR 3/4) and reddish-brown (5YR 4/4) light silty clay; moderate, medium, prismatic structure parting to moderate, fine and medium, subangular blocky; firm; mildly alkaline; clear, smooth boundary.

IIB23—46 to 56 inches, reddish-brown (2.5YR 4/4) and a variegated pattern of weak-red (2.5YR 4/2), dark-gray (N 4/0), and gray (N 5/0) light clay; moderate, medium, prismatic structure; firm; mildly alkaline; clear, smooth boundary.

IIB24—56 to 64 inches, reddish-brown (2.5YR 4/4) clay; gray (N 5/0) veins throughout; weak, medium, subangular blocky structure; firm; mildly alkaline; abrupt, smooth boundary.

IIIC—64 to 74 inches, light-gray to gray (10YR 6/1) light silty clay loam; common, fine and medium, distinct, yellowish-brown mottles; massive; mildly alkaline.

The solum ranges from 48 to 72 inches in thickness. The depth to the reddish IIB horizon ranges from 40 to 60 inches. The A horizon ranges from 15 to 24 inches in thickness, and from black to very dark gray. It is silty clay loam or silty clay. The gleyed, grayish B horizon is 20 to 30 inches thick. It ranges from heavy silty clay loam to silty clay. The reddish, clayey IIB horizon is 6 to 18 inches thick. It is light silty clay or clay. The IIIC horizon is commonly silt loam but is layers of silty clay loam, loam, clay loam, sand, or fine gravel in places. Reaction ranges from slightly acid to mildly alkaline throughout the profile.

The reddish color in the IIB horizon is not in the defined range for the series, but this difference does not alter the usefulness or behavior of the soils.

Montgomery soils formed in clayey deposits, as did Wabash and Niota soils. They have a thinner dark-colored A horizon than Wabash soils. They do not have an A2 horizon, which is characteristic of Niota soils, and they have more clay in their A horizon than those soils.

Montgomery silty clay loam (465).—This nearly level soil is on broad terraces. Areas are irregularly shaped and in most places are in the lowest position in the landscape. Most areas are less than 10 acres in size, but a few are more than 80 acres.

Included with this soil in mapping are a few wet areas that are less than 1 acre in size and are indicated on the soil map by the symbol for wet spots. Also included are some areas, about 1 acre in size, where slopes are short and narrow. These areas are indicated on the soil map by the symbol for escarpments.

Frequently the water table is high in this soil. In some places, flooding is a hazard. The high content of clay in the surface layer causes very poor workability. The organic-matter content is high.

This soil is used mainly for cultivated crops, but it is better suited to crops tolerant of a seasonally high water table and a clayey subsoil than to most others. Capability unit IIIw–1; woodland suitability group 2w6; wildlife group 6; recreation group 7.

Muscatine Series

The Muscatine series consists of somewhat poorly drained, nearly level soils on uplands. These soils formed in loess under native grass vegetation.

In a representative profile the surface layer is mainly very dark brown and black silt loam about 20 inches thick. The subsoil is 37 inches thick. The upper 6 inches of it is brown to dark-brown silty clay loam, the next 23 inches is light brownish-gray silty clay loam, and the lower 8 inches is gray to light-gray heavy silt loam. The subsoil is mottled throughout with yellowish brown. The underlying material is gray silt loam mottled with yellowish brown.

Muscatine soils are moderately permeable and have very high available water capacity. They are well suited to all crops commonly grown in the county.

Representative profile of Muscatine silt loam, 275 feet north of west corner of east-west fence, and 35 feet east of road fence in the northwest corner of SW¼SW¼NW¼ sec. 20, T. 16 N., R. 2 W.

Ap—0 to 7 inches, very dark brown (10YR 2/2) heavy silt loam, very dark grayish brown (10YR 3/2) dry; massive parting to moderate, very fine to medium, granular structure; friable, firm if massive; neutral; abrupt, smooth boundary.

A12—7 to 14 inches, black (10YR 2/1) heavy silt loam; moderate, very fine to medium, granular structure; friable; slightly acid; clear, smooth boundary.

A3—14 to 20 inches, very dark gray (10YR 3/1) and some brown (10YR 5/3) silty clay loam; moderate, fine and medium, granular structure; friable; medium acid; clear, smooth boundary.

B21t—20 to 26 inches, brown to dark-brown (10YR 4/3) silty clay loam; common, fine, distinct, yellowish-brown (10YR 5/8) and strong-brown (7.5YR 5/6 and 5/8) mottles; thin, discontinuous, dark grayish-brown (10YR 4/2) clay films on faces of peds; moderate, medium and coarse, subangular blocky structure; friable; medium acid; clear, smooth boundary.

B22t—26 to 34 inches, light brownish-gray (10YR 6/2) heavy silty clay loam; common, fine, prominent, yellowish-brown (10YR 5/6 and 5/8) mottles; thin, discontinuous, dark grayish-brown (10YR 4/2) and grayish-brown (10YR 5/2) clay films on faces of peds; weak, fine, prismatic structure parting to moderate, medium, subangular blocky; friable; very dark brown (10YR 2/2) iron-manganese concretions; medium acid; gradual, smooth boundary.

B23t—34 to 49 inches, light brownish-gray (10YR 6/2) silty clay loam; many, fine and medium, prominent, yellowish-brown (10YR 5/6 and 5/8) mottles; thin, discontinuous, grayish-brown (10YR 5/2) clay films on faces of peds; moderate, coarse, prismatic structure; firm; few very dark brown (10YR 2/2) iron-manganese concretions; medium acid; gradual, smooth boundary.

B3t—49 to 57 inches, gray to light-gray (10YR 6/1) heavy silt loam; many, fine and medium, prominent, yellowish-brown (10YR 5/6 and 5/8) mottles; weak, coarse, prismatic structure; friable; very dark brown (10YR 2/2) iron-manganese concretions; slightly acid; clear, smooth boundary.

C—57 to 60 inches, gray to light-gray (10YR 6/1) silt loam; many, fine and medium, prominent, yellowish-brown (10YR 5/6 and 5/8) mottles; massive; friable; neutral.

The solum ranges from 40 to 60 inches in thickness. The A horizon is 15 to 20 inches thick. It ranges from silt loam to light silty clay loam. The silty clay loam B horizon ranges from 30 to 45 inches in thickness. The silt loam C horizon ranges from slightly acid to moderately alkaline.

Muscatine soils are in a soil pattern with Tama and Sable soils. They are more poorly drained than Tama soils and are better drained than Sable soils.

Muscatine silt loam (41).—In most places this nearly level soil is on broad ridgetops, mainly away from drainageways toward the center of the ridgetop. Areas are irregularly shaped. Most are less than 80 acres in size, but a few are more than 1,500 acres.

Included with this soil in mapping are a few areas of Muscatine soils at heads of drainageways where slopes are 3 or 4 percent. These soils are subject to erosion and, in most places, have a dark-colored surface layer about 7 to 14 inches thick. A few poorly drained soils that are about 1 acre in size are indicated on the soil map by the symbol for wet spots. Also included are some less productive Denny soils that are about 1 acre in size and are indicated on the soil map by a spot symbol.

Occasionally the water table is high in this soil. The organic-matter content is high.

This soil is used mainly for cultivated crops, but it is suited to all crops commonly grown in the county. Capability unit I–2; woodland suitability group 2o1; wildlife group 4; recreation group 5.

Niota Series

The Niota series consists of poorly drained, nearly level soils on terraces. These soils formed in clayey, water-deposited sediment.

In a representative profile the surface layer is black silt loam about 7 inches thick. The subsurface layer is silt loam about 7 inches thick. It is grayish brown, dark grayish brown, and very dark gray and has a few iron-manganese concretions. The subsoil is 39 inches thick. The upper 10 inches of it is grayish-brown and reddish-brown silty clay, and the lower 29 inches is grayish silty clay loam that has reddish mottles and few iron-manganese concretions and stains. The underlying material is light-gray to gray silt loam that has reddish mottles and iron-manganese concretions and stains.

Niota soils are slowly permeable and have high available water capacity. They are better suited to crops tolerant of a seasonally high water table and a clayey subsoil than to most others.

Representative profile of Niota silt loam, 43 feet southwest along center of road from a point in line with center of field gate and 143 feet northwest and perpendicular to center of Illinois Highway 2 in the northwest corner of SW¼SE¼SW¼ sec. 30, T. 19 N., R. 3 E.

A1—0 to 7 inches, black (10YR 2/1) silt loam, gray (10YR 5/1) dry; moderate, very fine and fine, granular structure; friable; grayish-brown (10YR 5/2) A2 material in lower part; neutral; clear, smooth boundary.

A2—7 to 14 inches, grayish-brown (10YR 5/2), dark grayish-brown (10YR 4/2), and very dark gray (10YR 3/1) silt loam; moderate, thin, platy structure; friable; few iron-manganese concretions and some patchy, light-gray (10YR 7/1), uncoated silt grains in lower part; strongly acid; abrupt, smooth boundary.

IIB21t—14 to 24 inches, grayish-brown (2.5Y 5/2) and reddish-brown (5YR 4/4) silty clay; moderate, medium, subangular blocky structure; very firm; very strongly acid; clear, smooth boundary.

IIB22t—24 to 33 inches, gray (5Y 5/1) and light-gray to gray (5Y 6/1) silty clay loam; few, fine and medium, prominent, yellowish-red (5YR 4/6) mottles; moderate dark-gray (5YR 4/1) clay films that are discontinuous on vertical faces of peds only; moderate, medium, prismatic structure parting to moderate, medium, subangular blocky; firm; few iron-manganese concretions and stains; very strongly acid; gradual, smooth boundary.

IIIB3—33 to 53 inches, light-gray to gray (5Y 6/1) heavy silt loam; few, fine and medium, prominent, yellowish-red (5YR 4/6) mottles; moderate reddish-gray (5YR 5/2) clay films that are patchy on vertical faces of peds only; weak, coarse, prismatic structure; friable; clay films tend to follow root channels; many iron-manganese concretions and stains; very strongly acid; clear, smooth boundary.

IIIC—53 to 60 inches, light-gray to gray (5Y 6/1) silt loam; many, fine and medium, prominent yellowish-red (5YR 4/6 and 5YR 5/6) mottles; massive; some black (10YR 2/1) root channel fillings; common black iron-manganese concretions and stains; slightly acid.

The solum ranges from 36 to 60 inches in thickness. The silt loam A1 or Ap horizon is 6 to 10 inches thick. The silt loam A2 horizon ranges from 5 to 15 inches in thickness. It ranges from dark grayish brown to light brownish gray, but darker material from the surface layer is mixed into it in some places. The B horizon is 25 to 45 inches thick. It averages between 35 and 50 percent clay, but individual layers range from silty clay to silt loam. The C horizon is commonly silt loam, but it is layers of silty clay loam, loam, clay loam, sandy loam, sand, or fine gravel in places. The C horizon ranges from medium acid to neutral.

Niota soils formed in clayey deposits, as did Wabash and Montgomery soils. They have less clay in the A horizon than Montgomery or Wabash soils. They have a prominent A2 horizon, and Montgomery or Wabash soils commonly do not.

Niota silt loam (261).—In most places this nearly level soil is on terraces. In many places, it occupies prominent benches between escarpments on uplands and terraces. These areas are somewhat long and narrow and are several to many feet higher in elevation than associated alluvial soils. In other places areas are irregularly shaped and are on low-lying positions on broad terraces. Most areas are less than 10 acres in size, but a few are more than 40 acres.

Included with this soil in mapping are a few wet areas that are less than 1 acre in size and are indicated on the soil map by the symbol for wet spots. Also included are several droughty sandy areas that are about 1 acre in size and are indicated on the soil map by the symbol for sand spots.

Frequently the water table is high in this soil. The organic-matter content is moderate.

This soil is used mainly for cultivated crops and pasture, but it is better suited to plants tolerant of a seasonally high water table and a clayey subsoil than to most others. Capability unit IIIw–1; woodland suitability group 3w2; wildlife group 6; recreation group 7.

Oakville Series

The Oakville series consists of well-drained, gently sloping to strongly sloping soils on terraces and moderately sloping to very steep soils on uplands. These soils formed in sandy deposits under native timber vegetation.

In a representative profile the surface layer is dark grayish-brown and very dark grayish-brown loamy fine sand about 8 inches thick. The subsoil is about 10 inches thick. It is dark yellowish-brown and yellowish-brown fine sand. The underlying material is yellowish-brown fine sand.

Oakville soils are droughty. They are very rapidly permeable and have very low to low available water capacity. They are better suited to drought-resistant crops than to most others.

Representative profile of Oakville fine sand, 2 to 12 percent slopes, 600 feet east and 75 feet north of southwest corner of NW¼ of sec. 17, T. 16 N., R. 5 W.

Ap—0 to 8 inches, dark grayish-brown (10YR 4/2) and very dark grayish-brown (10YR 3/2) loamy fine sand; weak, very fine and fine, granular structure; very friable; neutral; abrupt, smooth boundary.

B2—8 to 14 inches, dark yellowish-brown (10YR 4/4) and yellowish-brown (10YR 5/4) fine sand; moderate, coarse, subangular blocky structure parting to single grained; very friable; neutral; clear, smooth boundary.

B3—14 to 18 inches, yellowish-brown (10YR 5/4) and dark yellowish-brown (10YR 4/4) fine sand; weak, coarse, subangular blocky structure parting to single grained; very friable; neutral; clear, smooth boundary.

C11—18 to 41 inches, yellowish-brown (10YR 5/4) fine sand; single grained; neutral; clear, smooth boundary.

C12—41 to 64 inches, yellowish-brown (10YR 5/4) fine sand; single grained; many 1/16-inch thick very fine streaks of dark-brown (7.5YR 4/4) fine sand; neutral.

The solum ranges from 18 to 40 inches in thickness. The A horizon ranges from loamy fine sand to fine sand. It is 5 to 10 inches thick in uneroded areas. It is slightly acid or neutral. The B horizon is 10 to 30 inches thick. It ranges from fine sand to loamy fine sand, and it is slightly acid or neutral. The C horizon is loamy fine sand or fine sand and ranges from neutral to moderately alkaline. In places it has free carbonates.

Oakville soils formed in thick sand, as did Sparta and Chute soils. They have a thinner A horizon than Sparta soils and a thicker solum than Chute soils.

Oakville fine sand, 2 to 12 percent slopes (741C).—In most places this soil is on stream terraces. In a few places it is on the crowns of large dunes or occupies entire small dunes on uplands. Areas are in the shape of the sand deposit and are oriented in the direction the sand was laid down. Most areas are less than 10 acres in size. This soil has the profile described as representative of the series.

Included with this soil in mapping are a few minor areas of somewhat more productive Bloomfield soils.

This soil is subject to soil blowing in unprotected areas. Droughtiness is a severe hazard. The organic-matter content is low.

This soil is mainly used for cultivated crops. It is suited to specialty crops if fertilizer is regulated and the supply of water is adequate. Some areas are in pasture or are woodland. Capability unit IVs–1; woodland suitability group 4s2; wildlife group 7; recreation group 3.

Oakville fine sand, 12 to 60 percent slopes (741F).—In most places this soil is on the sides of dunes or on side slopes in dissected sandy uplands. Most areas are less than 40 acres in size. The profile of this soil is similar to the one described as representative of the series, but the subsoil is thinner.

Included with this soil in mapping are a few areas where the surface layer is thicker and darker colored and the organic-matter content is somewhat higher. Sandy soils that are high in gravel content are included. In places wind has reworked the sand and brought underlying gravel into the soil. In other places wind has removed the sand, and gravel is concentrated at the surface. Where these areas are less than 1 acre in size, they are indicated on the soil map by the symbol for gravel. Also included are blowouts less than 1 acre in size that are indicated on the soil map by the symbol for blowouts.

This soil is subject to soil blowing in unprotected areas. Droughtiness is a severe hazard. The organic-matter content is low.

Some areas of this soil are used for crops or pasture, but most areas are in woodland. The soil is better suited to drought-resistant grasses or trees than to most other uses. Capability unit VIIs–1; woodland suitability group 3r3; wildlife group 7; recreation group 4.

Orion Series

The Orion series consists of somewhat poorly drained, nearly level soils on bottom lands. These soils formed in silty alluvium.

In a representative profile the surface layer is about 21 inches thick. It is dark grayish-brown silt loam mottled with yellowish brown. The underlying material to a depth of 27 inches is a very dark gray and dark grayish-brown band of silt loam that has brownish mottles. Below this depth it is black silt loam mottled with grayish brown.

Orion soils are moderately permeable and have very high available water capacity. They are suited to all crops commonly grown in the county.

Representative profile of Orion silt loam, 55 feet northeast perpendicular to curve in road in the southwest corner of NW¼SE¼NW¼ sec. 13, T. 16 N., R. 2 W.

A1—0 to 21 inches, dark grayish-brown (10YR 4/2) silt loam; common, fine, distinct, dark yellowish-brown (10YR 3/4) mottles and few, fine, distinct, yellowish-brown (10YR 5/4) mottles; weak to moderate, thick, platy structure; friable; very dark grayish-brown (10YR 3/2) worm channel coatings; many, fine, pores; mildly alkaline; abrupt, smooth boundary.

C—21 to 27 inches, very dark gray (10YR 3/1) and some dark grayish-brown (2.5Y 4/2) silt loam; streaks of grayish-brown (10YR 5/2) mottles, common, fine, distinct, dark yellowish-brown (10YR 3/4) mottles, and few, fine, prominent, strong-brown (7.5YR 5/6) mottles; weak, very thick, platy structure; friable; white (10YR 8/1) fine silica layers; many fine pores; few very dark grayish-brown (10YR 3/2) worm casts; mildly alkaline; abrupt, smooth boundary.

Ab—27 to 45 inches, black (10YR 2/1) silt loam; dark grayish-brown (2.5Y 4/2) mottles in streaks and in worm channel fillings in upper 6 inches; weak and moderate, fine, subangular blocky structure parting to granular; friable; fine silica grains; many fine pores; neutral.

The silt loam A horizon and C horizon have a combined thickness of 20 to 40 inches. They range from slightly acid to mildly alkaline. The dark-colored buried soil ranges from silt loam to silty clay loam and is 10 to 30 inches thick. It is slightly acid to neutral.

Orion soils are on bottom lands, as are Radford and Sawmill soils. They have a lighter colored A horizon than Radford soils. They are lighter colored and have less clay in the upper 20 to 40 inches of the profile than Sawmill soils.

Orion silt loam (415).—In most places this soil is on bottom lands that extend onto uplands from broader flood plains. Some areas are adjacent to bluffs. Areas are irregularly shaped and extend out onto broad bottom lands. Most are less than 50 acres in size, but a few are more than 600 acres.

Included with this soil in mapping are soils that have higher organic-matter content and are less subject to surface crusting than Orion soils. A few alkaline soils that require special fertilizer and areas several acres in size of somewhat droughty sandy or gravelly outwash are included. Included are sandy areas that are less than about 1 acre in size, a few areas of very poorly drained soils that are about 1 acre in size, and several small pits. All these areas are indicated on the soil map by spot symbols. Also included are some areas, about 1 acre in size, where slopes are short and narrow. These areas are indicated on the soil map by the symbol for escarpments.

Occasionally the water table is high in this soil. Flooding is a hazard on unprotected bottom lands. The organic-matter content is moderately low.

This soil is used mainly for cultivated crops and is suited to this use. The degree of suitability for any use in areas subject to overflow depends on the frequency and duration of flooding. Capability unit I–3; woodland suitability group 2o4; wildlife group 5; recreation group 6.

Otter Series

The Otter series consists of poorly drained, nearly level soils on bottom lands. These soils formed in silty alluvium.

In a representative profile the plow layer is mainly very dark gray silt loam about 7 inches thick. The next 12 inches is black silty clay loam that has brownish mottles, and below this is 21 inches of very dark gray and dark-gray silt loam that has brownish mottles. The underlying material to a depth of 53 inches is very dark gray silt loam that has brownish mottles. Below this depth it is dark-gray silt loam that has brownish mottles.

Otter soils are moderately permeable and have very high available water capacity. They are better suited to crops tolerant of a seasonally high water table than to most others.

Representative profile of Otter silt loam, 25 feet west and 270 feet south of gate in east-west fence in the southeast corner of NW¼SW¼SW¼ sec. 31, T. 17 N., R. 5 W.

Ap—0 to 7 inches, very dark gray (10YR 3/1) and some dark grayish-brown (10YR 4/2) silt loam; massive parting to moderate, very fine to medium, granular structure; friable; some light-gray (10YR 7/2) dry silt loam at a depth of 6 to 7 inches has strong, thin, platy structure; recent overwash; mildly alkaline; abrupt, smooth boundary.

A12—7 to 19 inches, black (10YR 2/1) silty clay loam, upper part very dark gray (10YR 3/1); few, fine, distinct, dark yellowish-brown (10YR 3/4) and pale-brown (10YR 6/3) mottles; moderate, medium, prismatic structure parting to moderate, fine, subangular blocky and angular blocky; friable; lower half of horizon has heaviest texture, is light brownish gray (10YR 6/2), and has thin platy structure; neutral; clear, smooth boundary.

A13—19 to 31 inches, very dark gray (10YR 3/1) heavy silt loam; common, fine, faint, dark grayish-brown (10YR 4/2) mottles; moderate, fine, subangular blocky structure; friable; neutral; clear, smooth boundary.

A3—31 to 40 inches, dark-gray (10YR 4/1) silt loam; few, fine, faint, pale-brown (10YR 6/3) mottles and few, fine, distinct, grayish-brown (2.5Y 5/2) and olive-brown (2.5Y 4/4) mottles; weak, fine, subangular blocky structure; friable; common sand grains; neutral; gradual, smooth boundary.

C1g—40 to 53 inches, very dark gray (N 3/0) silt loam; common, fine, distinct, dark-brown (10YR 4/3) mottles; massive; common sand grains; neutral; clear, smooth boundary.

C2g—53 to 64 inches, dark-gray (N 4/0) silt loam; common, fine, distinct, dark-brown (10YR 3/3) and light olive-brown (2.5Y 5/4) mottles; massive; neutral; clear, smooth boundary.

The A horizon ranges from 24 to 40 inches in thickness. It ranges from slightly acid to mildly alkaline. It is commonly silt loam, but it is stratified silty clay loam, loam, clay loam, or sandy loam in places. The gleyed C horizon is commonly silt loam, but it is layers of loam, clay loam, sandy loam, or sand in places. It ranges from neutral to moderately alkaline.

Otter soils are in similar positions to Sawmill and Radford soils. They have less clay than Sawmill soils. They are more poorly drained than Radford soils and do not have the dark-colored buried soil characteristic of those soils.

Otter silt loam (76).—In most places this nearly level soil is within broad flood plains at one of the lowest positions in the landscape. Areas are irregularly shaped. Most are less than 10 acres in size. This soil has the profile described as representative of the series.

Included with this soil in mapping are less productive sandy areas that are about 1 acre in size and are indicated on the soil map by the symbol for sand spots. A few areas of Otter silt loam, wet, that are less than 1 acre in size are indicated on the soil map by a spot symbol. Also included are some areas that are about 1 acre in size and are indicated on the soil map by the symbol for escarpments.

Frequently the water table is high in this soil. Flooding is a hazard on unprotected bottom lands. The organic-matter content is high.

This soil is used mainly for cultivated crops and pasture. It is better suited to crops tolerant of a seasonally high water table than to most others. The degree of suitability for any use in areas subject to overflow depends on the frequency and duration of flooding. Capability unit IIw–2; woodland suitability group 2w5; wildlife group 6; recreation group 8.

Otter silt loam, wet (W76).—In most places this soil is in depressions that lack natural drainage outlets. In places it is in long and narrow sloughs. Most areas are

circular or oblong in shape and are less than 10 acres in size. This soil has a profile similar to the one described as representative of the series, but it is wet during most of the year.

Included with this soil in mapping are some areas, about 1 acre in size, where slopes are short and narrow. These areas are indicated on the soil map by the symbol for escarpments. A few areas of Marsh that are less than 1 acre in size are included. Also included are several areas of muck in the vicinity of the city of Silvis. These areas have a very high volume change upon wetting and drying.

This soil has a permanent high water table. Ponding is a hazard. The organic-matter content is high.

Most areas of this soil are idle, but some areas are used for permanent pasture or woodland. The degree of suitability for any use depends on the frequency and duration of ponding. Capability unit Vw; woodland suitability group 2w5; wildlife group 6; recreation group 8.

Port Byron Series

The Port Byron series consists of well drained and moderately well drained, nearly level to moderately sloping soils on uplands. These soils formed in deep loess under natural grass vegetation.

In a representative profile the surface layer is silt loam about 16 inches thick. The upper 8 inches is very dark gray, and the lower 8 inches is very dark grayish brown and dark brown. The subsoil is 31 inches thick. The upper 16 inches of it is dark-brown and dark yellowish-brown silt loam, and the lower 15 inches is dark-brown silt loam that has brownish mottles. The underlying material is silt loam that has brownish mottles.

Port Byron soils are moderately permeable and have very high available water capacity. They are well suited to the cultivated crops commonly grown and to grasses and legumes.

Representative profile of Port Byron silt loam, 0 to 2 percent slopes, 433 feet west of center of north-south road, and 110 feet south of center of Hillsdale-Port Byron highway in the northwest corner of NE¼-NW¼NE¼ sec. 30, T. 19 N., R. 3 E.

Ap—0 to 8 inches, very dark gray (10YR 3/1) silt loam, grayish brown (10YR 5/2) dry; moderate, very fine and fine, granular structure; friable; compaction plates in lower part; neutral; abrupt, smooth boundary.

A3—8 to 16 inches, very dark grayish-brown (10YR 3/2) and dark-brown (10YR 4/3) silt loam; moderate, medium, subangular blocky structure parting to moderate, fine, granular; friable; neutral; gradual, smooth boundary.

B21—16 to 32 inches, dark-brown (10YR 4/3) and dark yellowish-brown (10YR 4/4) silt loam; moderate, medium, prismatic structure parting to moderate, medium, subangular blocky; friable; few thin organic coatings in root channels; slightly acid; abrupt, smooth boundary.

B22—32 to 47 inches, dark-brown (10YR 4/3) silt loam; common, fine, distinct, grayish-brown (2.5Y 5/2), yellowish-brown (10YR 5/6), and dark-brown (7.5YR 4/4) mottles; moderate, medium and coarse, prismatic structure; friable; few iron-manganese concretions; slightly acid; gradual, smooth boundary.

C—47 to 60 inches, mottled grayish-brown (2.5Y 5/2), yellowish-brown (10YR 5/6), and dark-brown (7.5YR 4/4) silt loam; massive; few iron-manganese concretions; slightly acid.

The solum ranges from 40 to 60 inches in thickness. The silt loam A horizon ranges from 10 to 20 inches in thickness. The silt loam B horizon ranges from 30 to 40 inches in thickness. The silt loam C horizon ranges from medium acid to moderately alkaline.

Port Byron soils formed in thick loess, as did Tama and Joy soils. They have less clay in their B horizon than Tama soils. They are better drained than Joy soils.

Port Byron silt loam, 0 to 2 percent slopes (277A).—In most places this soil is in areas below and between dunes. In many places it is in the lowest position on the landscape. Most areas are less than 20 acres in size, but a few are more than 60 acres. This soil has the profile described as representative of the series.

Included with this soil in mapping are moderately well drained soils that are similar to Port Byron silt loam but their surface layer is more than 24 inches thick and the organic-matter content is higher. Included are soils in the vicinity of Foster in Drury Township that are similar to Port Byron silt loam but have loose sand at a depth of 40 to 60 inches. Nearby water supplies are subject to contamination if filtering devices are placed in these soils. A few areas are included in Coe Township that have a thinner surface layer and are lower in content of organic matter than Port Byron soils. Also included are a few less productive, poorly drained soils that are about 1 acre in size and are indicated on the soil map by the symbol for wet spots.

This soil is moderate in content of organic matter.

This soil is used mainly for cultivated crops, but is well suited to all crops commonly grown in the county. Capability unit I–1; woodland suitability group 1o1; wildlife group 1; recreation group 1.

Port Byron silt loam, 2 to 6 percent slopes (277B).—In most places this soil is in areas below and between dunes. It is in no apparent pattern, but in most places, tends to finger between and around the dunes. Most areas are less than 20 acres in size, but a few are more than 160 acres.

Included with this soil in mapping are soils in the vicinity of Foster in Drury Township that are similar to Port Byron silt loam but have loose sand at a depth of 40 to 60 inches. Nearby water supplies are subject to contamination if filtering devices are placed in these soils. Also included are a few poorly drained soils that are about 1 acre in size, sandy areas that are about 1 acre in size, and a few severely eroded areas that are less than 1 acre in size. All these areas are indicated on the soil map by spot symbols.

This soil is subject to erosion if slopes are improperly managed. The organic-matter content is moderate.

This soil is used mainly for cultivated crops, but is well suited to all crops commonly grown in the county. Capability unit IIe–1; woodland suitability group 1o1; wildlife group 1; recreation group 1.

Quarry

Quarry (Qu) occurs where limestone rock has been mechanically removed. Many areas are rectangular or

square in shape, but some are confined within irregular property lines. One quarry that occupies an entire island in the Rock River is spherical in shape. A few limestone quarries are small, but some are more than 200 acres in size.

The limestone rock is excavated to a depth of many feet, and hard rock is exposed in the remaining area.

Unless reclaimed by addition of fertile fill material, areas are limited mainly to uses not affected by hard rock. Spoil material removed in excavation is adjacent to most areas. This material is part of the limestone quarry, or in places is fill material. Most limestone quarries are idle or are used for trash collection. Quarry is not assigned to a capability unit or a woodland, wildlife, or recreation group.

Raddle Series

The Raddle series consists of moderately well drained and well drained, nearly level to moderately sloping soils on terraces. These soils formed in silty material under native prairie vegetation.

In a representative profile the surface layer is mainly black and very dark gray silt loam about 19 inches thick. The subsoil is silt loam about 29 inches thick. The upper 7 inches of it is brown to dark brown, the next 16 inches is yellowish brown, and the lower 6 inches is pale brown mottled with yellowish brown. The underlying materal is stratified layers of yellowish-brown loamy sand and grayish-brown silt loam mottled with yellowish brown.

Raddle soils are moderately permeable and have very high available water capacity. They are well suited to all crops commonly grown in the county.

Representative profile of Raddle silt loam, 0 to 2 percent slopes, 150 feet east and 20 feet north of section line corner in field in the southwest corner of SW¼-SW¼NW¼ sec. 19, T. 17 N., R. 1 W.

Ap—0 to 9 inches, black (10YR 2/1) silt loam, gray (10YR 5/1) dry; compact parting to moderate, very fine and fine, granular structure; friable; many sand grains; medium acid; clear, smooth boundary.

A12—9 to 19 inches, very dark gray (10YR 3/1) silt loam in upper part and very dark gray (10YR 3/1) and dark-brown (10YR 3/3) silt loam in lower part; compact parting to moderate, very fine and fine, granular structure; friable; many sand grains; slightly acid; clear, smooth boundary.

B1—19 to 26 inches, brown to dark-brown (10YR 4/3) silt loam; thin, discontinuous, dark grayish-brown (10YR 4/2) organic films on faces of peds; weak, medium, prismatic structure; friable; many sand grains; slightly acid; clear, smooth boundary.

B2—26 to 42 inches, yellowish-brown (10YR 5/4) silt loam; thin, grayish-brown (10YR 5/2) clay films that are continuous on vertical faces of peds; weak, coarse, prismatic structure; friable; many sand grains; neutral; clear, smooth boundary.

B3—42 to 48 inches, pale-brown (10YR 6/3) silt loam; few, fine, distinct, yellowish-brown (10YR 5/6) mottles; weak, coarse, prismatic structure; friable; many sand grains; few black iron-manganese concretions; neutral; abrupt, smooth boundary.

IIC1—48 to 52 inches, yellowish-brown (10YR 5/4) fine sandy loam; single grained; neutral; abrupt, smooth boundary.

IIIC2—52 to 71 inches, grayish-brown (10YR 5/2) silt loam; many, fine, prominent, yellowish-brown (10YR 5/4 and 5/6) mottles; massive; neutral; gradual, smooth boundary.

The solum ranges from 40 to 60 inches in thickness. The A horizon ranges from 10 to 20 inches in thickness and from black to dark brown. It is silt loam or loam. The B horizon ranges from 30 to 40 inches in thickness. It is silt loam or loam. The C horizon is commonly stratified loam, silt loam, and sandy loam, but has layers of sand and loamy sand in places. It is medium acid to mildly alkaline.

Raddle soils are on terraces, as are Joslin and Coyne soils. They do not have the reddish IIB horizon that is characteristic of Joslin and Coyne soils.

Raddle silt loam, 0 to 2 percent slopes (430A).—This soil is in areas that are in no apparent pattern and are irregularly shaped. Most areas are less than 25 acres in size, but a few are more than 160 acres. This soil has the profile described as representative of the series.

Included with this soil in mapping are a few areas of soils that have a thinner surface layer and are lower in content of organic matter than Raddle soils. Included are soils that have a surface layer of fine sandy loam, which is easily blown by wind. Also included are sandy areas that are about 1 acre in size and are indicated on the soil map by a spot symbol.

This soil is moderate in content of organic matter.

This soil is used mainly for cultivated crops, but it is well suited to all crops commonly grown in the county. Capability unit I–1; woodland suitability group 1o1; wildlife group 1; recreation group 1.

Raddle silt loam, 2 to 6 percent slopes (430B).—This soil is on terraces, commonly at the foot slopes to adjacent hills. Areas are mainly irregularly shaped but extend out from uplands. In places areas are elongated in the shape of terraces. Most are less than 20 acres in size, but a few are more than 60 acres.

Included with this soil in mapping are a few areas of soils that have a thinner surface layer and are lower in content of organic matter than Raddle soils and a few that have a thicker surface layer and are higher in content of organic matter than Raddle soils. Included are several areas of soils that have a surface layer of fine sandy loam, which is easily blown by wind. Other sandy areas that are about 1 acre in size and severely eroded areas that are about 1 acre in size are indicated on the soil map by a spot symbol. Also included are several areas where limestone bedrock crops out, and these areas are indicated on the soil map by the symbol for outcrops.

This soil is subject to erosion if slopes are improperly managed. The organic-matter content is moderate.

This soil is used mainly for cultivated crops, but it is well suited to all crops commonly grown in the county. Capability unit IIe–1; woodland suitability group 1o1; wildlife group 1; recreation group 1.

Radford Series

The Radford series consists of somewhat poorly drained, nearly level soils on bottom lands. These soils formed in silty alluvium.

In a representative profile the surface layer is very dark gray silt loam about 10 inches thick. The underlying material to a depth of about 27 inches is very dark gray silt loam stratified with grayish brown. Below this to a depth of about 51 inches is black silty clay loam. Below a depth of 51 inches is dark-gray silty clay loam mottled with yellowish brown.

Radford soils are moderately permeable and have very high available water capacity. They are well suited to all crops commonly grown in the county.

Representative profile of Radford silt loam, 131 feet south of east-west section line and 162 feet west of north-south section line in the southeast corner of NE¼NE¼NE¼ sec. 30, T. 17 N., R. 1 W.

Ap—0 to 10 inches, very dark gray (10YR 3/1) silt loam; weak, medium, subangular blocky structure parting to strong, very fine and fine, granular; friable; neutral; clear, smooth boundary.

C—10 to 27 inches, very dark gray (10YR 3/1) silt loam stratified with some grayish brown (10YR 5/2); common, fine, distinct, dark-brown and brown (7.5YR 4/4 and 10YR 4/3) and dark-brown (7.5YR 3/2) mottles; moderate, medium, platy structure; friable; neutral; lower 3 inches has same structure as IIA1b horizon; gradual, smooth boundary.

IIA1b—27 to 51 inches, black (10YR 2/1) silty clay loam; few, fine, faint, dark-brown (7.5YR 3/2) mottles in lower 4 inches; few black (N 2/0) iron-manganese concretions in lower 4 inches; moderate, medium, prismatic structure parting to moderate, medium and coarse, subangular blocky; friable; neutral; upper 2 inches has ½-inch sandy loam lenses; gradual, smooth boundary.

IIB2b—51 to 64 inches, dark-gray (N 4/0) silty clay loam; common, fine, prominent, yellowish-brown (10YR 5/6 and 5/8) and dark yellowish-brown (10YR 4/4) mottles; few black (N 2/0) iron-manganese concretions; strong, medium, prismatic structure; firm; neutral.

The silt loam A horizon and C horizon combined ranges from 20 to 40 inches in thickness and from slightly acid to mildly alkaline. The A horizon ranges from 6 to 10 inches in thickness, and from black to very dark grayish brown. The dark-colored silty clay loam buried soil ranges from 10 to 30 inches in thickness. It is slightly acid or neutral.

Radford soils are on bottom lands, as are Sawmill and Orion soils. They are better drained and have less clay in the upper part of the solum than Sawmill soils. They have a darker colored silt loam A horizon than Orion soils.

Radford silt loam (74).—This nearly level soil is on narrow bottom lands that extend onto prairies on uplands from broader flood plains. Most areas are less than 25 acres in size, but a few are more than 200 acres.

Included with this soil in mapping are areas where the silt loam is less than 20 inches thick. These areas tend to have a higher water table part of the year. A few poorly drained soils that are about 1 acre in size are indicated on the soil map by the symbol for wet spots. Also included are less productive sandy areas that are about 1 acre in size and are indicated on the soil map by a spot symbol.

Occasionally the water table is high in this soil. Flooding is a hazard on unprotected bottom lands. The organic-matter content is moderate.

This soil is used mainly for cultivated crops and is suited to this use. The degree of suitability for any use in areas subject to overflow depends on the frequency and duration of flooding. Capability unit I–3; woodland suitability group 2o4; wildlife group 5; recreation group 6.

Rozetta Series

The Rozetta series consists of moderately well drained, nearly level soils on uplands. These soils formed in deep loess under native timber vegetation.

In a representative profile the surface layer is dark grayish-brown, brown to dark-brown, and yellowish-brown silt loam about 8 inches thick. The subsoil is silty clay loam about 54 inches thick. The upper 13 inches of it is dark yellowish brown and has many black iron-manganese concretions; the next 20 inches is yellowish brown, has brown to dark-brown and light brownish-gray mottles, and has many black iron-manganese concretions; and the lower 21 inches is mottled yellowish brown, light brownish gray, and brown to dark brown and has many black iron-manganese concretions. The underlying material is mottled silt loam that has many iron-manganese concretions.

Rozetta soils are moderately permeable and have high to very high available water capacity. They are well suited to all crops commonly grown in the county.

Representative profile of Rozetta silt loam, 471 feet west along road fence from center of lane to homestead and 48 feet north in the southwest corner of SE¼-SW¼SE¼ sec. 1, T. 18 N., R. 1 E.

Ap—0 to 8 inches, dark grayish-brown (10YR 4/2), brown to dark-brown (10YR 4/3), and yellowish-brown (10YR 5/4) silt loam, yellowish brown (10YR 5/4) and pale brown (10YR 6/3) dry; strong, thick and very thick, platy structure to a depth of 4 inches and moderate, very fine and fine, granular structure below that depth; friable; platy structure due to compaction; numerous, black (N 2/0) iron-manganese concretions; few fine pores; neutral; abrupt, smooth boundary.

B1t—8 to 12 inches, dark yellowish-brown (10YR 4/4) light silty clay loam; thin, discontinuous, brown and dark-brown (10YR 4/3) clay films on faces of peds; moderate, fine, subangular blocky structure; friable; many, light-gray (10YR 7/1) dry, uncoated silt grains on faces of peds; many black (N 2/0) iron-manganese concretions; few fine pores; neutral; clear, smooth boundary.

B21t—12 to 21 inches, dark yellowish-brown (10YR 4/4) silty clay loam; thin, continuous, brown to dark-brown (10YR 4/3) clay films on faces of peds; strong, fine and medium, angular blocky and subangular blocky structure, slight tendency to prismatic; firm; many, light-gray (10YR 7/1) dry, uncoated silt grains; many black (N 2/0) iron-manganese concretions; few fine pores; strongly acid; clear, smooth boundary.

B22t—21 to 31 inches, yellowish-brown (10YR 5/4) silty clay loam; common, fine, prominent, brown to dark-brown (7.5YR 4/4) and light brownish-gray (2.5Y 6/2) mottles; thin, continuous, brown to dark-brown (10YR 4/3) clay films on faces of peds; moderate, medium, prismatic structure parting to strong, fine and medium, angular blocky and subangular blocky; firm; many, light-gray (10YR 7/1) dry, uncoated silt grains; many black (N 2/0) iron-manganese concretions; some fine pores; strongly acid; clear, smooth boundary.

B23t—31 to 41 inches, yellowish-brown (10YR 5/4) silty clay loam; many, fine, prominent, brown to dark-brown (7.5YR 4/4) and light brownish-gray (2.5Y 6/2) mottles; thin, discontinuous, brown to dark-brown (10YR 4/3) clay films on faces of peds; weak, coarse, prismatic structure; firm; many, light-gray (10YR 7/1) dry, uncoated silt grains on faces of peds; many black (N 2/0) iron-manganese concretions; many fine pores; strongly acid; gradual, smooth boundary.

B3t—41 to 62 inches, mottled yellowish-brown (10YR 5/4), light brownish-gray (2.5Y 6/2), and brown to dark-brown (7.5YR 4/4) light silty clay loam; thin, patchy, brown to dark-brown (10YR 4/3) clay films on faces of peds; weak, coarse, pris-

matic structure; firm; many, light-gray (10YR 7/1) dry, uncoated silt grains; many black (N 2/0) iron-manganese concretions; many fine pores; strongly acid; clear, smooth boundary.

C—62 to 68 inches, mottled yellowish-brown (10YR 5/4), light brownish-gray (2.5Y 6/2), and brown to dark-brown (7.5YR 4/4) silt loam; brown to dark-brown (10YR 4/3) films in root channels; massive; many black (N 2/0) iron-manganese concretions; few fine pores; medium acid.

The solum ranges from 48 to 72 inches in thickness. The silt loam A horizon ranges from 6 to 10 inches in thickness. In some undisturbed areas the A1 horizon is less than 6 inches thick and ranges from very dark gray (10YR 3/1) to very dark grayish brown (10YR 3/2). The A2 horizon, where present, is silt loam 2 to 4 inches thick. It ranges from grayish brown (10YR 5/2) to light brownish gray (10YR 6/2). The silty clay loam B horizon ranges from 40 to 60 inches in thickness. The upper 10 inches of the B horizon do not have mottles or have those of chromas more than 2. The silt loam C horizon ranges from medium acid to moderately alkaline.

Rozetta soils are in a soil pattern with Fayette and Stronghurst soils. They are more poorly drained than Fayette soils, and the water table is 3 to 4 feet below the surface during some of the year. They are better drained than Stronghurst soils.

Rozetta silt loam (279).—In most places this nearly level soil is on ridgetops. Areas are irregularly shaped and tend to finger between more sloping drainageways. Most are less than 10 acres in size, but a few are more than 25 acres.

Included with this soil in mapping in or near some metropolitan areas are Rozetta soils where the surface layer is missing. Also included are a few areas of less productive, poorly drained soils that are indicated on the soil map by wet spot or Denny symbols.

This soil is moderately low in content of organic matter.

This soil is used mainly for cultivated crops, but it is well suited to all crops commonly grown in the county. In some places this soil is used for urban development, and it is well suited to this purpose. Capability unit I–1; woodland suitability group 2o1; wildlife group 1; recreation group 1.

Sable Series

The Sable series consists of poorly drained, nearly level soils in depressions on uplands. These soils formed in loess under native water-tolerant grass vegetation.

In a representative profile the surface layer is mainly black silty clay loam about 23 inches thick. The subsoil is about 34 inches thick. It is mainly olive-gray silty clay loam mottled with yellowish brown. The underlying material is gray silt loam mottled with yellowish brown.

Sable soils are moderately permeable and have very high available water capacity. They are better suited to crops tolerant of a seasonally high water table than to most others.

Representative profile of Sable silty clay loam, 74 feet east along east-west fence from middle of field lane and 43 feet north in the southwest corner of SW¼NW¼SE¼ sec. 7, T. 16 N., R. 3 W.

Ap—0 to 6 inches, black (10YR 2/1) light silty clay loam; massive and firm parting to moderate, fine and medium, granular structure and friable; massive due to compaction; medium acid; abrupt, smooth boundary.

A12—6 to 18 inches, black (10YR 2/1) light silty clay loam; weak, fine and medium, granular structure; friable; medium acid; clear, smooth boundary.

A3—18 to 23 inches, very dark gray (10YR 3/1) silty clay loam; few, fine, distinct, grayish-brown (2.5Y 5/2) mottles; weak, medium, prismatic structure parting to moderate, coarse, granular; friable; medium acid; clear, smooth boundary.

B2g—23 to 45 inches, olive-gray (5Y 5/2) silty clay loam; common, fine, distinct, yellowish-brown (10YR 5/6) and light olive-brown (2.5Y 5/4) mottles; thin, discontinuous, very dark gray (N 3/0) and dark-gray (N 4/0) clay films on faces of peds; strong, medium and coarse, prismatic structure; firm; root channels filled with organic material; mildly alkaline; gradual, smooth boundary.

B3g—45 to 57 inches, light olive-gray (5Y 6/2) light silty clay loam; many, fine and medium, prominent, yellowish-brown (10YR 5/6 and 10YR 5/8) mottles; thin, patchy, dark-gray (N 4/0) clay films on faces of peds; weak, coarse, prismatic structure; firm; root channels filled with organic material; mildly alkaline; gradual, smooth boundary.

Cg—57 to 60 inches, gray to light-gray (5Y 6/1) silt loam; many, fine and medium, prominent, yellowish-brown (10YR 5/6 and 10YR 5/8) mottles; massive; root channels filled with organic material; moderately alkaline.

The solum ranges from 40 to 60 inches in thickness. The black silty clay loam A horizon ranges from 18 to 24 inches in thickness. The silty clay loam B horizon is 30 to 40 inches thick. The silt loam C horizon ranges from neutral to moderately alkaline.

Sable soils are in a soil pattern with Muscatine and Denny soils. They are more poorly drained than Muscatine soils. They have more clay in the A horizon and do not have the A2 horizon characteristic of Denny soils.

Sable silty clay loam (68).—In most places this nearly level soil is in depressions, mainly away from drainageways within larger areas of Muscatine or Atterberry soils. Areas are irregularly shaped. Most are less than 10 acres in size, but a few are more than 200 acres.

Included with this soil in mapping are a few areas of soils that are similar to Sable soils but have a surface layer of silt loam and are less cloddy when dried than Sable silty clay loam. Included are several areas of highly productive Muscatine soils. Also included are a few very poorly drained soils and some less productive Denny soils, both of which are about 1 acre in size and are indicated on the soil map by spot symbols.

Frequently the water table is high in this soil. The high clay content of the surface layer causes poor workability. The organic-matter content is high.

This soil is used mainly for cultivated crops, but it is better suited to crops tolerant of a seasonally high water table than to most others. Capability unit IIw–1; woodland suitability group 2w3; wildlife group 6; recreation group 7.

Saude Series

The Saude series consists of nearly level to gently sloping, well-drained soils on terraces. These soils formed in loamy deposits over mixed sand and gravel. The native vegetation was prairie grasses.

In a representative profile the surface layer is very dark gray loam about 14 inches thick. The subsoil is loam about 15 inches thick. The upper 8 inches of it is very dark gray, very dark grayish brown, and dark

brown, and the lower 7 inches is brown and dark brown. The underlying material is mainly yellowish-brown and dark-brown medium and coarse sand and fine gravel.

Saude soils are somewhat droughty. They are moderately rapidly permeable and have moderate available water capacity. They are suited to all crops commonly grown in the county, but they are better suited to drought-resistant crops.

Representative profile of Saude loam in an area of Burkhardt-Saude complex, 0 to 4 percent slopes, 77 feet east of north-south road fence and 43 feet north of east-west fence in the southwest corner of SW¼NW¼-SE¼ sec. 10, T. 20 N., R. 2 E.

Ap—0 to 9 inches, very dark gray (10YR 3/1) loam; massive parting to moderate, medium, subangular blocky structure; friable; medium acid; clear, smooth boundary.

A12—9 to 14 inches, very dark gray (10YR 3/1) light loam; weak, coarse, subangular blocky structure parting to moderate, fine and medium, granular; friable; medium acid; clear, smooth boundary.

B1—14 to 22 inches, very dark gray (10YR 3/1), very dark grayish-brown (10YR 3/2), and dark-brown (7.5YR 3/2) loam; moderate, medium, prismatic structure parting to moderate, medium, subangular blocky; friable; strongly acid; clear, smooth boundary.

B2—22 to 29 inches, brown and dark-brown (7.5YR 4/4) loam; moderate, discontinuous, dark-brown (7.5YR 3/2) organic clay coatings on faces of peds; weak, coarse, subangular blocky structure; friable; strongly acid; clear, smooth boundary.

IIC—29 to 50 inches, yellowish-brown (10YR 5/4) and dark-brown (10YR 3/3) medium and coarse sand and fine gravel; single grained; medium acid.

The solum ranges from 24 to 40 inches in thickness. The A horizon is 10 to 20 inches thick and is loam or silt loam. The loamy B horizon is loam or silt loam and ranges from 10 to 30 inches in thickness. The IIB horizon, if present, ranges from sandy loam to loamy sand. The C horizon is medium and coarse sand and is 20 to 40 percent fine gravel. It is medium acid or slightly acid.

Saude soils are on terraces, as are Burkhardt and Waukee soils. They have less sand and a thicker solum than Burkhardt soils. They have appreciably more gravel in the lower part of the B horizon and in the C horizon than Waukee soils.

Saude loam (774).—This nearly level soil is in areas that are in no apparent pattern and are irregularly shaped. Most areas are less than 20 acres in size, but a few are more than 60 acres.

Included with this soil in mapping are several areas where some of the surface layer is missing. These areas are indicated on the soil map by a spot symbol.

This soil is somewhat droughty during seasonally dry periods. The organic-matter content is moderate.

This soil is used mainly for cultivated crops commonly grown in the county, but if irrigated it is suited to specialty crops. Capability unit IIs–2; woodland suitability group 3s2; wildlife group 7; recreation group 2.

Sawmill Series

The Sawmill series consists of poorly drained, nearly level soils in depressions on bottom lands. These soils formed in silty alluvium.

In a representative profile the surface layer is about 32 inches thick. It is mainly black silty clay loam and has brownish mottles in the lower part. The subsoil is gray silty clay loam, has brownish and reddish mottles, and is 18 inches thick. The underlying material is dark-gray and gray silty clay loam that has olive and yellowish-brown mottles.

Sawmill soils are moderately to moderately slowly permeable and have very high available water capacity. They are better suited to crops tolerant of a seasonally high water table than to most others.

Representative profile of Sawmill silty clay loam, 400 feet west of Meredosia ditch spoil bank along east-west fence and 40 feet south in the northwest corner of SW¼SE¼SW¼ sec. 11, T. 20 N., R. 2 E.

Ap—0 to 9 inches, black (10YR 2/1) silty clay loam; strong, fine and medium, subangular blocky and angular blocky structure; firm; neutral; abrupt, smooth boundary.

A12—9 to 14 inches, black (10YR 2/1) silty clay loam; massive, dense plowsole; slightly acid; abrupt, smooth boundary.

A13—14 to 21 inches, black (10YR 2/1) silty clay loam; strong, medium, prismatic structure parting to moderate, medium, subangular and angular blocky; sticky; slightly acid; clear, smooth boundary.

A3—21 to 32 inches, very dark gray (10YR 3/1) silty clay loam; many, medium, prominent, dark-brown and brown (7.5YR 4/4), yellowish-brown (10YR 5/4), light yellowish-brown (10YR 6/4), and dark reddish-brown (5YR 3/4) mottles adjacent to root channels; strong, fine, prismatic structure; sticky; slightly acid; gradual, smooth boundary.

B2g—32 to 50 inches, gray (5Y 5/1) silty clay loam; common, medium, distinct, strong-brown (7.5YR 5/6) and yellowish-red (5YR 4/6) mottles adjacent to root channels; large black (N 2/0) heavy silty clay loam krotovina at a depth of 32 to 42 inches; weak, coarse, subangular blocky structure; neutral; clear, smooth boundary.

Cg—50 to 60 inches, dark-gray (N 4/0) and gray (N 5/0) silty clay loam; common, medium, prominent, olive (5Y 5/3) and yellowish-brown (10YR 5/6) mottles; massive; recent channel fillings of black (N 2/0) surface material; neutral; clear, smooth boundary.

The solum ranges from 40 to 60 inches in thickness and from slightly acid to mildly alkaline. The silty clay loam A horizon ranges from 24 to 36 inches in thickness and from black to very dark gray. The gleyed B horizon is dominantly silty clay loam but ranges to clay loam and silt loam. It ranges from neutral to moderately alkaline.

Sawmill soils are on bottom lands, as are Radford and Otter soils. They have more clay in the A horizon than Radford or Otter soils. They have more clay throughout than the Otter soils.

Sawmill silty clay loam (107).—In most places this nearly level soil is on one of the lowest positions in the landscape, in areas within broad flood plains or adjacent to rivers or creeks. Areas are irregularly shaped. Most are less than 100 acres in size, but a few are more than 3,000 acres. Slope ranges from 0 to 2 percent. This soil has the profile described as representative of the series.

Included with this soil in mapping are some areas that have less than 20 inches of recent silt loam deposition and are less cloddy when dried than Sawmill silty clay loam. In a few areas outcrops of sand and less productive, very poorly drained soils are indicated on the soil map by spot symbols. Some areas about 1 acre in size are included where slopes are short and narrow.

These areas are indicated on the soil map by the symbol for escarpments. Also included are areas of less productive shale or sandstone. These areas are indicated on the soil map by the symbol for rock outcrop.

Frequently the water table is high. Flooding is a hazard on unprotected bottom lands. The high content of clay in the surface soil causes poor workability. The organic-matter content is high.

This soil is used mainly for cultivated crops, but is better suited to crops tolerant of a seasonally high water table than to most others. The degree of suitability for any use in areas subject to overflow depends on the frequency and duration of flooding. Capability unit IIw–2; woodland suitability group 2w5; wildlife group 6; recreation group 8.

Sawmill silty clay loam, wet (W107).—In most places this nearly level soil is in areas that lack natural drainage outlets. In some places it is in long and narrow sloughs. Areas are mostly circular or oblong in shape. Most are less than 20 acres in size, but some are more than 400 acres.

Included with this soil in mapping are small wet areas of Otter silt loam, Millington silt loam, and Wabash silty clay. Each of these behave differently under the same kind of management. Also included are some areas of Marsh that are less than 1 acre in size.

This soil has a permanent high water table. Ponding is a hazard. The organic-matter content is high.

Most areas of this soil are idle, but some are used for permanent pasture. The degree of suitability for any use depends on the frequency and duration of ponding. Capability unit Vw; woodland suitability group 2w5; wildlife group 6; recreation group 8.

Seaton Series

The Seaton series consists of well-drained, gently sloping to steep soils on uplands. These soils formed in deep loess under native timber vegetation.

In a representative profile the surface layer is mainly dark grayish-brown silt loam about 8 inches thick. The subsurface layer is dark yellowish-brown silt loam about 2 inches thick. The subsoil is silt loam about 45 inches thick. The upper 37 inches of it is dark yellowish brown, and the lower 8 inches is yellowish brown mottled with gray. The underlying material is yellowish-brown silt mottled with gray.

Seaton soils are moderately permeable and have very high available water capacity. They are suited to the cultivated crops commonly grown if erosion is controlled. They are well suited to common grass and legume crops.

Representative profile of Seaton silt loam, 2 to 6 percent slopes, 330 feet east of post on west side of field entrance along east-west fence and 36 feet south of fence in the northwest corner of NW¼NE¼NW¼ sec. 30, T. 19 N., R. 3 E.

Ap—0 to 8 inches, dark grayish-brown (10YR 4/2) and some dark yellowish-brown (10YR 4/4) silt loam; compact parting to moderate, very fine and fine, granular structure; friable; neutral; abrupt, smooth boundary.

A2—8 to 10 inches, dark yellowish-brown (10YR 4/4) and some yellowish-brown (10YR 5/4) silt loam; weak, thin, platy structure; friable; neutral; clear, smooth boundary.

B21t—10 to 25 inches, dark yellowish-brown (10YR 4/4) heavy silt loam; thin, continuous, dark-brown (10YR 4/3) clay films on faces of peds; weak, medium, prismatic structure parting to moderate, medium, subangular blocky; friable; medium acid; clear, smooth boundary.

B22t—25 to 47 inches, dark yellowish-brown (10YR 4/4) silt loam; thin, discontinuous, dark-brown (10YR 4/3) clay films on faces of peds; moderate, medium, subangular blocky structure; friable; many white (10YR 8/1) when dry, uncoated silt grains; medium acid; clear, smooth boundary.

B3—47 to 55 inches, yellowish-brown (10YR 5/4) silt loam; thin, patchy, brown (10YR 5/3) clay films on faces of peds; few, fine, prominent, gray (5Y 6/1) mottles; moderate, coarse, prismatic structure; friable; medium acid; clear, smooth boundary.

C—55 to 65 inches, yellowish-brown (10YR 5/4) silt; few, fine, prominent, gray (5Y 6/1) mottles; massive; medium acid.

The solum ranges from 40 to 60 inches in thickness. The A horizon is silt loam and ranges from 5 to 12 inches in thickness in undisturbed areas. In some areas the A1 or Ap horizon is less than 6 inches thick and ranges from very dark gray (10YR 3/1) to very dark grayish brown (10YR 3/2). The B horizon ranges from silt loam to light silty clay loam and from 30 to 50 inches in thickness. The C horizon is silt loam or silt and ranges from medium acid to moderately alkaline.

Seaton soils formed in thick loess, as did Timula and Fayette soils. They have a thicker solum than Timula soils. They have less clay in the B horizon than Fayette soils.

Seaton silt loam, 2 to 6 percent slopes (274B).—In places this soil is on convex ridgetops. In some areas it fingers between and around more sloping drainageways, and in some areas it is at the crest of stronger side slopes. In other places it is below and between dunes. Areas are irregularly shaped and are in no apparent pattern. In most places they tend to finger between and around dunes. Most are less than 20 acres in size, but a few are more than 100 acres. This soil has the profile described as representative of the series.

Included with this soil in mapping are a few areas in Coe Township where the surface layer is thicker and darker colored than that of Seaton soils. These soils are higher in content of organic matter than Seaton soils.

This soil is subject to erosion if slopes are improperly managed. In places it receives sediment from higher lying soils on dunes. The organic-matter content is moderately low.

This soil is used mainly for cultivated crops, but it is well suited to all crops commonly grown in the county. Capability unit IIe–1; woodland suitability group 2o1; wildlife group 1; recreation group 1.

Seaton silt loam, 4 to 7 percent slopes, eroded (274C2).—In some places this soil is at the upper ends of valleys and on narrow convex ridgetops. In other places it is on sides of small dunes. Most areas are less than 10 acres in size, but a few are more than 30 acres. The profile of this soil is similar to the one described as representative of the series, but the surface layer is thinner and some subsoil material is mixed with it.

Included with this soil in mapping are severely eroded areas that are less than 1 acre in size and are indicated on the soil map by a spot symbol. These areas are very low in content of organic matter. Sand crops out in a few places, and these less productive areas are indicated on the soil map by a spot symbol.

This soil is subject to severe erosion if slopes are im-

properly managed. The organic-matter content is low.

This soil is used mainly for cultivated crops. If properly managed, it is suited to all crops commonly grown in the county. Capability unit IIe–1; woodland suitability group 2o1; wildlife group 1; recreation group 1.

Seaton silt loam, 7 to 12 percent slopes, eroded (274D2).—In some places this soil is on sides or at the upper ends of valleys below less sloping ridgetops. In other places it is on the sides of dunes. Most areas are less than 10 acres in size, but a few are more than 20 acres. The profile of this soil is similar to the one described as representative of the series, but the surface layer is thinner and some subsoil material is mixed with it.

Included with this soil in mapping are severely eroded areas that are less than 1 acre in size and are indicated on the soil map by a spot symbol. These areas are very low in content of organic matter. Sand crops out in a few places, and these less productive areas are indicated on the soil map by a spot symbol. Also included are unproductive areas of limestone bedrock that are indicated on the soil map by the symbol for rock outcrop.

This soil is subject to severe erosion if slopes are improperly managed. The organic-matter content is low.

This soil is used mainly for cultivated crops. If properly managed it is suited to all crops commonly grown in the county. Capability unit IIIe–1; woodland suitability group 2o1; wildlife group 1; recreation group 3.

Seaton silt loam, 12 to 18 percent slopes, eroded (274E2).—In some places this soil is on sides or at the upper ends of valleys between less sloping ridgetops and nearly level bottom lands or drainageways. In other places it is on the sides of dunes. Most areas are less than 10 acres in size, but a few are more than 15 acres. The profile of this soil is similar to the one described as representative of the series, but the surface layer is thinner and some subsoil material is mixed with it.

Included with this soil in mapping are severely eroded areas that are less than 1 acre in size and are indicated on the soil map by a spot symbol. These areas are very low in content of organic matter. Sand crops out in a few places, and these less productive areas are indicated on the soil map by a spot symbol. Also included are unproductive areas of limestone bedrock that are indicated on the soil map by the symbol for rock outcrop.

This soil is subject to severe erosion if slopes are improperly managed. The organic-matter content is moderately low.

This soil is used mainly for permanent pasture and is well suited to this use. Capability unit IVe–1; woodland suitability group 2r2; wildlife group 2; recreation group 4.

Seaton-Oakville complex, 7 to 12 percent slopes, eroded (942D2).—In most places this mapping unit is on crowns of large dunes or occupies entire small dunes. It is about 70 percent Seaton silt loam and about 30 percent Oakville fine sand. These soils are in a random pattern in the landscape. Commonly, Seaton soils are on the sides of dunes, and Oakville soils are on the crowns of dunes. Most areas are less than 15 acres in size, but a few are more than 50 acres. The profiles of these soils are similar to the ones described as representative of the Seaton and Oakville series, but the surface layers are thinner and some subsoil material is mixed with them.

Included with these soils in mapping are severely eroded areas that are less than 1 acre in size and are indicated on the soil map by a spot symbol. These areas are very low in content of organic matter. In some places calcareous fine sand crops out. These areas require special fertilizer treatment and water management.

These soils are subject to severe water erosion and soil blowing if slopes are improperly managed. The Oakville soil is droughty in seasonally dry periods. The organic-matter content is low.

These soils are used mainly for cultivated crops commonly grown in the county and for permanent pasture. They are suited to permanent pasture and woodland. Capability unit VIs–1; woodland suitability group 4s2; wildlife group 7; recreation group 3.

Seaton-Oakville complex, 12 to 18 percent slopes, eroded (942E2).—In most places this mapping unit occupies entire dunes. It is about 60 percent Seaton silt loam and about 40 percent Oakville fine sand. These soils are in a random pattern in the landscape. Commonly, Seaton soils are on the sides of dunes, and Oakville soils are on the crowns of dunes. On some dunes Seaton soils are at the top of the dune and near the lower part of the side slope, and Oakville soils occupy the middle part of the side slope. Most areas are less than 10 acres in size, but a few are more than 60 acres. The profiles of these soils are similar to the ones described as representative of the Seaton and Oakville series, but the surface layers are thinner and some subsoil material is mixed with them.

Included with these soils in mapping are severely eroded areas that are less than 1 acre in size and are indicated on the soil map by a spot symbol. These areas are very low in content of organic matter. In some places calcareous fine sand crops out. These areas require special fertilizer treatment and water management.

These soils are subject to severe water erosion and soil blowing if slopes are improperly managed. The Oakville soil is droughty in seasonally dry periods. The organic-matter content is low.

These soils are used mainly for permanent pasture, but they are better suited to permanent plant cover. Capability unit VIIs–1; woodland suitability group 4s2; wildlife group 7; recreation group 4.

Seaton-Oakville complex, 18 to 30 percent slopes, eroded (942F2).—In most places this mapping unit occupies entire dunes or the sides of some dunes. It is about 50 percent Seaton silt loam and about 50 percent Oakville fine sand. These soils are in a random pattern in the landscape. Commonly Seaton soils are near the top of the side slope of dunes, and Oakville soils occupy the lower part of the slope. In a few places Seaton soils are on the sides of dunes, and Oakville soils are on the crowns of dunes. Most areas are less than 20 acres in size, but a few are more than 125 acres. The profiles of these soils are similar to the ones described as repre-

sentative of the Seaton and Oakville series, but the surface layers are thinner and some subsoil material is mixed with them.

Included with these soils in mapping are severely eroded areas that are less than 1 acre in size and are indicated on the soil map by a spot symbol. These areas are very low in content of organic matter. Included are unproductive areas of limestone bedrock that are indicated on the soil map by the symbol for rock outcrop. Also included are some areas where calcareous fine sand crops out. These areas require special fertilizer treatment and water management.

These soils are subject to severe erosion on unvegetated slopes. The organic-matter content is low.

These soils are used mainly for pasture or woodland. The steep slopes and erosion hazard, however, limit their suitability mainly to permanent plant cover. Capability unit VIIs–1; woodland suitability group 3r3; wildlife group 7; recreation group 4.

Seaton-Timula silt loams, 7 to 12 percent slopes, eroded (943D2).—In most places this mapping unit is on crowns of large dunes or occupies entire small dunes. It is about 70 percent Seaton silt loam and about 30 percent Timula silt loam. These soils are in a random pattern in the landscape. Commonly Seaton soils are on the sides of dunes, and Timula soils are on the crowns of dunes. Most areas are less than 15 acres in size, but a few are more than 50 acres. The Timula soil has the profile described as representative of the Timula series. The profile of the Seaton soil is similar to the one described as representative of the Seaton series, but the surface layer is thinner and some subsoil material is mixed with it.

Included with these soils in mapping are areas where the surface layer is eroded away and highly calcareous, yellowish loess is exposed. It is difficult to establish vegetation and control erosion in these areas.

These soils are subject to severe erosion if slopes are improperly managed. The organic-matter content is low.

These soils are used mainly for cultivated crops commonly grown in the county and for permanent pasture. If erosion is controlled they are well suited to this use. Capability unit IIIe–1; woodland suitability group 3o1; wildlife group 1; recreation group 3.

Seaton-Timula silt loams, 12 to 18 percent slopes, eroded (943E2).—In most places this mapping unit occupies entire dunes. It is about 60 percent Seaton silt loam and about 40 percent Timula silt loam. These soils are in a random pattern in the landscape. Commonly Seaton soils are on the sides of dunes, and Timula soils are on the crowns of dunes. On some dunes Seaton soils are at the top of the dune and near the lower part of the side slope, and Timula soils occupy the middle part of the side slope. Most areas are less than 20 acres in size, but a few are more than 150 acres. The profiles of these soils are similar to the ones described as representative of the Seaton and Timula series, but the surface layers are thinner and some subsoil material is mixed with them.

Included with these soils in mapping are severely eroded areas that are less than 1 acre in size and are indicated on the soil map by a spot symbol. These areas are very low in content of organic matter. Included are unproductive areas of limestone bedrock that are indicated on the soil map by the symbol for rock outcrop. Also included are areas where the surface layer is eroded away and highly calcareous, yellowish loess is exposed. It is difficult to establish vegetation and control erosion in these areas.

The hazard of erosion is severe if slopes are improperly managed. The organic-matter content is low.

These soils are used mainly for cultivated crops commonly grown in the county and for permanent pasture. The moderately steep slopes and severe hazard of erosion, however, limit their suitability mainly to grasses and legumes. Capability unit IVe–1; woodland suitability group 3r2; wildlife group 2; recreation group 4.

Seaton-Timula silt loams, 18 to 30 percent slopes, eroded (943F2).—In most places this mapping unit occupies entire dunes or is on the sides of some dunes. It is about 50 percent Seaton silt loam and about 50 percent Timula silt loam. These soils are in a random pattern in the landscape. Commonly Seaton soils occupy the lower part of the slope. In a few places, Seaton soils are on the sides of dunes, and Timula soils are on the crowns of dunes. Most areas are less than 15 acres in size, but a few are more than 100 acres. The profiles of these soils are similar to the ones described as representative of the Seaton and Timula series, but the surface layers are thinner and some subsoil material is mixed with them.

Included with these soils in mapping are severely eroded areas that are less than 1 acre in size and are indicated on the soil map by a spot symbol. These areas are very low in content of organic matter. Included are some areas where the surface layer is eroded away and highly calcareous, yellowish loess is exposed. It is difficult to establish vegetation and control erosion in these areas. Unproductive areas of limestone bedrock are indicated on the soil map by the symbol for rock outcrop. Also included is a small acreage of Seaton and Timula soils where slopes are 30 to 60 percent. Uses are limited largely to trees in these areas.

These soils are subject to severe erosion on unvegetated slopes. The organic-matter content is low.

These soils are used mainly for pasture or woodland. The steep slopes and erosion hazard, however, limit their suitability mainly to permanent plant cover. Capability unit VIe–1; woodland suitability group 3r2; wildlife group 3; recreation group 4.

Seaton Series, Sandy Substratum

The Seaton series, sandy substratum, consists of well-drained, gently sloping to moderately sloping soils on uplands. These soils formed in loess and in the underlying sandy outwash under native timber vegetation.

In a representative profile the surface layer is dark grayish-brown silt loam about 5 inches thick. The subsurface layer is dark grayish-brown and yellowish-brown silt loam about 3 inches thick. The subsoil is about 35 inches thick. The upper 30 inches of it is mainly yellowish-brown silt loam, and the lower 5

inches is strong-brown heavy sandy loam. The underlying material is brownish and yellowish fine sand.

These soils are moderately permeable and have high available water capacity. They are suited to the cultivated crops commonly grown if erosion is controlled. They are also suited to the commonly grown grasses and legumes.

Representative profile of Seaton silt loam, sandy substratum, 2 to 6 percent slopes, 335 feet east along fence from corner post and 135 feet south in the northeast corner of SW¼SW¼SW¼ sec. 8, T. 16 N., R. 5 W.

Ap—0 to 5 inches, dark grayish-brown (10YR 4/2) silt loam; thick and very thick compaction plates that part to moderate, fine and medium, granular structure; compaction due to farming practices; friable; neutral; clear, smooth boundary.

A2—5 to 8 inches, dark grayish-brown (10YR 4/2) and yellowish-brown (10YR 5/4) heavy silt loam; moderate, thin and medium, platy structure; friable; neutral; abrupt, smooth boundary.

B1—8 to 13 inches, yellowish-brown (10YR 5/4) silt loam; thin, patchy, light-gray (10YR 7/1) silt grains on faces of peds; moderate, fine and medium, subangular blocky structure; friable; neutral; clear, smooth boundary.

B21—13 to 21 inches, dark yellowish-brown (10YR 4/4) heavy silt loam; thin, continuous, dark-brown (7.5YR 4/4) clay films on faces of peds; moderate, fine and medium, subangular blocky structure; friable; neutral; clear, smooth boundary.

B22t—21 to 28 inches, yellowish-brown (10YR 5/4) light silty clay loam; thin, discontinuous, dark-brown (7.5YR 4/4) and dark yellowish-brown (10YR 4/4) clay films on faces of peds; very thin, fine, light-gray (10YR 7/1) silt grains; moderate, medium and coarse, subangular blocky structure; friable; strongly acid; clear, smooth boundary.

B23t—28 to 38 inches, yellowish-brown (10YR 5/4) silt loam; few, medium, prominent, strong-brown (7.5YR 5/8) and yellowish-red (5YR 4/8) mottles; thin, discontinuous, dark yellowish-brown (10YR 4/4) clay films on faces of peds; moderate, medium and coarse, subangular blocky structure; friable; lower 2 inches is yellowish-brown (10YR 5/4) matrix and moderate, continuous, dark-brown (7.5YR 4/4) and reddish-brown (5YR 4/4) films on faces of peds; sand increases with increasing depth; strongly acid; gradual, smooth boundary.

IIB3—38 to 43 inches, strong-brown (7.5YR 5/6) heavy sandy loam; thin, discontinuous, dark-brown (7.5YR 4/4) clay films on faces of peds; weak, coarse, subangular blocky structure; friable; upper 1 inch yellowish-brown (10YR 5/4) matrix of light sandy loam; few iron-manganese concretions; strongly acid; clear, smooth boundary.

IIC—43 to 80 inches, yellow (10YR 7/6), dark-brown (7.5YR 4/4), and reddish-yellow (7.5YR 6/6) fine sand; single grained; medium acid.

The solum ranges from 40 to 60 inches in thickness. The A horizon is silt loam and ranges from 5 to 12 inches in thickness. The silty upper part of the B horizon ranges from silt loam to light silty clay loam and is 30 to 45 inches thick. The IIB horizon is 5 to 10 inches thick and ranges from loam to sandy loam. The IIC horizon ranges from loamy sand to sand and fine sand. It ranges from medium acid to neutral.

Seaton soils, sandy substratum, are associated with Seaton and Tell soils. They have a sandy IIC horizon at a depth below about 40 inches, whereas Seaton soils formed in loess more than 5 feet thick. They are deeper over the sandy IIC horizon than Tell soils.

Seaton silt loam, sandy substratum, 2 to 6 percent slopes (563B).—In most places this soil is on loess-covered sand deposits below adjacent soils on dunes and tends to finger between and around the dunes. In a few areas it is on the crowns of dunes on the sides of small dunes. Areas are in no apparent pattern. Most are less than 10 acres in size, but a few are more than 40 acres.

Included with this soil in mapping are a few areas of less productive, poorly drained soils that are indicated on the soil map by the symbol for wet spots. Sand crops out in a few places, and these droughty areas are indicated on the soil map by a spot symbol. Some areas, about 1 acre in size, where slopes are short and narrow are indicated on the soil map by the symbol for escarpments. Also included are some moderately sloping, eroded areas. The organic-matter content is lower in these soils.

This soil is subject to erosion if slopes are improperly managed. In places it receives sediment from higher lying soils on dunes. The organic-matter content is moderately low.

This soil is used mainly for cultivated crops, but is well suited to all crops commonly grown in the county. Capability unit IIe–1; woodland suitability group 2o1; wildlife group 1; recreation group 1.

Sparta Series

The Sparta series consists of nearly level to moderately sloping, excessively drained soils on terraces. These soils formed in sandy deposits under native prairie grasses.

In a representative profile the surface layer is mainly very dark grayish-brown sand about 28 inches thick. The subsoil is dark yellowish-brown sand about 8 inches thick. The underlying material is mainly yellowish-brown loose sand.

Sparta soils are droughty. They are very rapidly permeable and have very low available water capacity. They are better suited to drought-resistant crops than to most others.

Representative profile of Sparta sand, 0 to 6 percent slopes, 36 feet south of section line and 93 feet west of quarter line in the northeast corner of NE¼NE¼-NW¼ sec. 9, T. 20 N., R. 2 E.

A11—0 to 11 inches, very dark brown (10YR 2/2) sand; very weak, very fine, granular structure; very friable; neutral; clear, smooth boundary.

A12—11 to 21 inches, very dark grayish-brown (10YR 3/2) sand; very weak, very fine, granular structure; very friable; strongly acid; clear, smooth boundary.

A3—21 to 28 inches, very dark grayish-brown (10YR 3/2) and brown and dark-brown (10YR 4/3) sand; weak, coarse, subangular blocky structure; very friable strongly acid; gradual, smooth boundary.

B—28 to 36 inches, dark yellowish-brown (10YR 4/4) sand; single grained; very friable; strongly acid; gradual, smooth boundary.

C—36 to 60 inches, the upper part is mixed dark yellowish-brown (10YR 4/4) and yellowish-brown (10YR 5/6) sand, the lower part is yellowish-brown (10YR 5/4) sand; single grained; loose; medium acid.

The solum ranges from 24 to 40 inches in thickness. The A horizon is 15 to 28 inches thick and ranges from sand to loamy sand. The B horizon is 10 to 15 inches thick and is sand or loamy sand. The C horizon ranges from sand to sand mixed with gravel. It is medium acid to neutral.

Sparta soils are on terraces, as are Dickinson and Hoopeston soils. They are more sandy throughout the solum than Dickinson soils. They are better drained and have a sandier solum than Hoopeston soils.

Sparta sand, 0 to 6 percent slopes (88B).—In most places this soil is in broad areas. Areas are in the shape of the sand deposit and are oriented in the direction the sand was laid down. Some large areas in Cordova Township are more than 1,800 acres in size, but most are less than 80 acres.

Included with this soil in mapping are sandy soils that have a high content of gravel. In places wind has reworked the sand and underlying gravel and pebbles are in the profile, and in other places wind has removed most of the sand, and gravel is at a shallow depth. This underlying gravel is suitable for mining in most areas. Wind has caused severe erosion in some areas and blowouts have formed. Where these areas are less than 1 acre in size, they are indicated on the soil map by a spot symbol. Also included are areas of more sloping Sparta soils where gravel crops out on slopes. Where these areas are less than 1 acre in size, they are indicated on the soil map by a spot symbol.

This soil is subject to soil blowing in unprotected areas. Droughtiness is a severe hazard. The organic-matter content is moderately low.

This soil is used for cultivated crops, but many areas are in pasture or are idle. A few are used for growing evergreen trees. The soil is suited to specialty crops if fertilizer is regulated and the supply of water for supplemental irrigation is adequate. Capability unit IVs–1; woodland suitability group 4s2; wildlife group 7; recreation group 2.

Strawn Series

The Strawn series consists of steep to very steep, well drained and moderately well drained soils on uplands. These soils formed in loamy glacial till under native hardwood trees.

In a representative profile the surface layer is very dark grayish-brown loam about 6 inches thick. The subsurface layer is brown and very dark grayish-brown loam about 6 inches thick. The subsoil is dark yellowish-brown light clay loam about 11 inches thick. The underlying material is yellowish-brown loam and is moderately alkaline.

Strawn soils are moderately permeable and have moderate to high available water capacity. The high content of natural lime in the underlying material decreases the amount of available phosphate and potash, and these soils are better suited to plants that can tolerate the lime content than to most others. The slopes are too steep to be suited to cultivated crops.

Representative profile of Strawn loam in an area of Strawn-Chute complex, 25 to 60 percent slopes, 245 feet east of center of New Boston blacktop road along middle of lane and 23 feet north on cut in bank in the northwest corner of NE¼SE¼NW¼ sec. 31, T. 16 N., R. 5 W.

A1—0 to 6 inches, very dark grayish-brown (10YR 3/2) loam; strong, very fine and fine, granular structure; friable; slightly acid; clear, smooth boundary.

A2—6 to 12 inches, brown (10YR 4/3) and very dark grayish-brown (10YR 3/2) loam; moderate, fine and medium, subangular blocky structure; friable; medium acid; clear, smooth boundary.

B2t—12 to 23 inches, dark yellowish-brown (10YR 4/4) light clay loam; thin, discontinuous, dark-brown (10YR 3/3) clay films on faces of peds; weak, medium and coarse, subangular blocky structure parting to moderate, fine and medium, subangular blocky; friable; neutral; gradual, smooth boundary.

C—23 to 50 inches, yellowish-brown (10YR 5/4) loam; massive; moderately alkaline; violently effervescent.

The solum ranges from 10 to 24 inches in thickness. In undisturbed areas the A horizon is loam or silt loam and is 4 to 12 inches thick. In most undisturbed areas the A1 horizon is less than 6 inches thick and ranges from very dark gray (10YR 3/1) to very dark grayish brown (10YR 3/2). The B horizon ranges from 6 to 20 inches in thickness. It is loam or clay loam. The C horizon is loam or silt loam. It ranges from moderately alkaline to very strongly alkaline.

Strawn soils formed in glacial till, as did Hickory and Velma soils. They have a thinner solum than Hickory or Velma soils. They have a lighter colored or a thinner dark-colored A horizon than Velma soils.

Strawn-Chute complex, 25 to 60 percent slopes (959G).—This mapping unit is on sides of valleys, commonly between less sloping ridgetops and nearly level bottom lands or drainageways. It is about 60 percent Strawn loam and about 40 percent Chute fine sand. On most slopes Strawn soils are below Chute soils. Chute soils occupy as much as 75 percent of the slopes adjacent to small tributaries, but Strawn soils occupy more than 50 percent of slopes facing the larger stream valleys. Most areas are less than 75 acres in size, but a few are more than 100 acres. These soils have the profiles described as representative of the Strawn and Chute series.

These soils are subject to severe erosion if slopes are improperly managed. The organic-matter content is moderately low.

These soils are used mainly for permanent pasture and timber, but the steep slopes and erosion hazard limit their suitability to trees. Capability unit VIIe–1; woodland suitability group 3r3; wildlife group 7; recreation group 4.

Stronghurst Series

The Stronghurst series consists of somewhat poorly drained, nearly level soils on uplands. These soils formed in loess under native forest vegetation.

In a representative profile the surface layer is mainly dark grayish-brown silt loam about 10 inches thick. The subsoil is silty clay loam about 41 inches thick. The upper 11 inches of it is mainly yellowish brown and has brownish mottles, the next 8 inches is pale brown and has many brownish and reddish mottles, and the lower 22 inches is olive gray and has many brownish mottles. The underlying material is olive-gray silt loam that has brownish mottles.

Stronghurst soils are moderately to moderately slowly permeable and have very high to high available water capacity. They are suited to all crops commonly grown in the county.

Representative profile of Stronghurst silt loam, 160 feet south of road fence along east side of orchard lane and 47 feet east in the southwest corner of SW¼SW¼-NE¼ sec. 17, T. 18 N., R. 1 E.

Ap—0 to 10 inches, dark grayish-brown (10YR 4/2) and some brown (10YR 5/3) silt loam, light brownish gray (10YR 6/2) and pale brown (10YR 6/3) dry; moderate, thin, platy structure; friable; many light-gray (10YR 7/1) dry, uncoated silt grains; many iron-manganese concretions; many fine pores and root channels; neutral; abrupt, smooth boundary.

B1—10 to 14 inches, yellowish-brown (10YR 5/4) light silty clay loam; thin, discontinuous, dark grayish-brown (10YR 4/2) and brown to dark-brown (10YR 4/3) organic coatings on faces of peds; moderate, fine and medium, subangular blocky structure; friable; few dark grayish-brown (10YR 4/2) worm casts; many black (N 2/0) iron-manganese concretions; many, light-gray (10YR 7/1) dry, uncoated silt grains; many fine pores and root channels; neutral; clear, smooth boundary.

B21t—14 to 21 inches, yellowish-brown (10YR 5/4) silty clay loam; few, fine, distinct, brown to dark-brown (7.5YR 4/4) mottles; thin, continuous, dark grayish-brown (10YR 4/2) clay films on faces of peds; moderate to strong, fine and medium, subangular blocky and angular blocky structure; friable; few, light-gray (10YR 7/1) dry, uncoated silt grains; many black (N 2/0) iron-manganese concretions; many fine pores and root channels; slightly acid; clear, smooth boundary.

B22t—21 to 29 inches, pale-brown (10YR 6/3) silty clay loam; common, fine, prominent, brown to dark-brown (7.5YR 4/4), dark reddish-brown (5YR 3/4), yellowish-red (5YR 4/8), and yellowish-brown (10YR 5/6) mottles; thin, continuous, grayish-brown (10YR 5/2) and brown to dark-brown (7.5YR 4/2) clay films on faces of peds; strong, fine and medium, subangular blocky and angular blocky structure, slight tendency towards prismatic; firm; many black (N 2/0) iron-manganese concretions; some fine pores and root channels; medium acid; clear, smooth boundary.

B23t—29 to 40 inches, light olive-gray (5Y 6/2) and olive-gray (5Y 5/2) silty clay loam; many, fine and medium, prominent, strong-brown (7.5YR 5/6 and 7.5YR 5/8) mottles; thin, discontinuous, brown to dark-brown (7.5YR 4/2) and grayish-brown (10YR 5/2) coatings on faces of peds; moderate, medium, prismatic structure; firm; many black (N 2/0) iron-manganese concretions; few, fine pores; strongly acid; clear, smooth boundary.

B3t—40 to 51 inches, mixed olive-gray (5Y 5/2) and light olive-gray (5Y 6/2) light silty clay loam; many, fine and medium, prominent, strong-brown (7.5YR 5/6 and 7.5YR 5/8) mottles; thin, discontinuous, brown to dark-brown (7.5 YR 4/2) and grayish-brown (10YR 5/2) coatings on faces of peds; weak, coarse, prismatic structure; firm; many black (N 2/0) iron-manganese concretions; few fine pores; slightly acid; clear, smooth boundary.

C—51 to 60 inches, olive-gray (5Y 5/2) silt loam; common, fine and medium, prominent, strong-brown (7.5YR 5/6 and 7.5YR 5/8) mottles; massive; many iron-manganese concretions; fine pores and root channels; slightly acid.

The solum ranges from 48 to 60 inches in thickness. The silt loam Ap horizon ranges from 6 to 10 inches in thickness. In some undisturbed areas the A1 horizon is less than 6 inches thick and ranges from very dark gray (10YR 3/1) to very dark grayish brown (10YR 3/2). The silty clay loam B horizon is 30 to 50 inches thick. The silt loam C horizon ranges from medium acid to moderately alkaline.

Stronghurst soils are in a soil pattern with Fayette and Atterberry soils. They are more poorly drained than Fayette soils. They have a lighter colored or a thinner dark-colored A horizon than Atterberry soils.

Stronghurst silt loam (278).—In most places this nearly level soil is on ridgetops, mainly away from drainageways toward the center of ridgetops. Areas are irregularly shaped. Most are less than 10 acres in size, but a few are more than 100 acres.

Included with this soil in mapping are a few areas at the heads of drainageways where slopes are 3 to 5 percent. These soils are eroded in most places and need stabilizing. Some poorly drained soils similar to Stronghurst soils are included. These soils remain wet for longer periods after rain than Stronghurst soils and need artificial drainage. Other poorly drained, less productive soils that are about 1 acre in size are indicated on the soil map by a spot symbol. Also included are some areas of Stronghurst soils in or near metropolitan areas where the surface layer is missing. Interpretations for these areas are based mainly on subsoil characteristics.

Occasionally the water table is high in this soil. The organic-matter content is moderately low.

This soil is used mainly for cultivated crops, but it is suited to all crops commonly grown in the county. In places this soil is used for urban development, but it is not well suited to this use. Capability unit IIw–1; woodland suitability group 3o1; wildlife group 4; recreation group 5.

Sylvan Series

The Sylvan series consists of strongly sloping to very steep, well-drained soils on uplands. These soils formed in deep loess under native timber vegetation.

In a representative profile the surface layer is very dark grayish-brown silt loam about 6 inches thick. The subsoil is about 24 inches thick. The upper 9 inches of it is dark yellowish-brown silty clay loam, and the lower 15 inches is yellowish-brown silt loam. The underlying material is yellowish-brown silt loam that is moderately alkaline.

Sylvan soils are moderately permeable and have high available water capacity. The high content of natural lime in the underlying material decreases the amount of available phosphate and potash. These soils are suited to the cultivated crops commonly grown if erosion is controlled. They are well suited to the commonly grown grasses and legumes.

Representative profile of Sylvan silt loam, 18 to 30 percent slopes, 177 feet north of corner of east-west fence and northeast-southwest fence in the northwest corner of SW¼NW¼SE¼ sec. 29, T. 17 N., R. 2 W.

Ap—0 to 6 inches, very dark grayish-brown (10YR 3/2) silt loam; moderate, medium, subangular blocky and blocky structure parting to moderate, thin and medium, platy; friable; neutral; clear, smooth boundary.

B2t—6 to 15 inches, dark yellowish-brown (10YR 4/4) light silty clay loam; thin, discontinuous, brown and dark-brown (10YR 4/3) organic coatings on faces of peds; moderate, fine and medium, subangular blocky structure; friable; neutral; clear, smooth boundary.

B3—15 to 30 inches, yellowish-brown (10YR 5/4) silt loam; thin, patchy, brown and dark-brown (10YR 4/3) organic coatings on faces of peds; weak, coarse,

subangular blocky structure; friable; mildly alkaline; clear, smooth boundary.

C—30 to 60 inches, yellowish-brown (10YR 5/4) silt loam; common, fine, prominent, light-gray (10YR 7/1) lime concretions; massive; moderately alkaline; strongly effervescent.

The solum ranges from 20 to 40 inches in thickness. In undisturbed areas the A horizon is silt loam and ranges from 5 to 12 inches in thickness. In some undisturbed areas the A1 horizon is less than 6 inches thick and ranges from very dark gray (10YR 3/1) to very dark grayish brown (10YR 3/2). The B horizon is 20 to 25 inches thick. The B2t horizon is light silty clay loam or medium silty clay loam. The B3 horizon ranges from light silty clay loam to silt loam. The silt loam C horizon is mildly alkaline or moderately alkaline.

Sylvan soils formed in thick loess, as did Fayette and Elkhart soils. Their solum is thinner than that of Fayette soils. They have a thinner A horizon than Elkhart soils.

Sylvan silt loam, 12 to 18 percent slopes (19E).—In most places this soil is on sides or at upper ends of valleys between less sloping ridgetops and nearly level bottom lands or drainageways. In a few places it occupies the upper part of the slope above soils formed in till or shale. Most areas are less than 5 acres in size, but a few are more than 18 acres.

Included with this soil in mapping are a few areas of Fayette soils and soils similar to Sylvan soils that are not calcareous at a depth above 40 inches, both of which are more productive. Included are some areas of eroded Sylvan and Fayette soils where part of the surface layer is missing and tilth is poorer. Some less productive, severely eroded areas are indicated on the soil map by a spot symbol. Also included are a few areas of very poorly drained soils that are indicated on the soil map by the symbol for wet spots.

This soil is subject to erosion if slopes are improperly managed. The organic-matter content is moderately low.

This soil is used mainly for permanent pasture or timber and is well suited to these uses. Capability unit IVe–1; woodland suitability group 2r2; wildlife group 2; recreation group 4.

Sylvan silt loam, 18 to 30 percent slopes (19F).—In most places this soil is on sides or at upper ends of valleys, commonly between less sloping ridgetops and nearly level bottom lands or drainageways. Most areas are less than 5 acres in size, but a few are more than 16 acres. This soil has the profile described as representative of the Sylvan series.

Included with this soil in mapping are a few areas of soils similar to Sylvan soils that are more productive and are not calcareous at a depth above 40 inches and areas of soils similar to Sylvan soils that are less productive and are sandy throughout the profile. Less productive sandy areas that are about 1 acre in size are indicated on the soil map by a spot symbol. Also included are some areas of eroded Sylvan soils where part of the surface soil is missing and tilth is poorer.

This soil is subject to erosion if slopes are improperly managed. The organic-matter content is moderately low.

This soil is used mainly for permanent pasture or timber and is suited to these uses. Capability unit VIe–1; woodland suitability group 2r2; wildlife group 3; recreation group 4.

Sylvan soils, 7 to 12 percent slopes, severely eroded (19D3).—In most places this mapping unit is on short sides or at upper ends of valleys below less sloping ridgetops. In a few places it occupies the upper part of the slope above soils formed in till or shale. Most areas are less than 10 acres in size, but a few are more than 25 acres. These soils have profiles similar to the one described as representative of the series, but the surface layer is mainly the dark yellowish-brown silty clay loam subsoil.

Included with these soils in mapping are a few areas of less productive soils where calcareous loess crops out on slopes. Included are some areas of soils similar to Sylvan soils that are more productive and are not calcareous at a depth above 40 inches. Also included are minor areas of less eroded Sylvan soils where less of the surface layer is missing and tilth is better than in severely eroded Sylvan soils.

These soils are subject to further erosion if slopes are improperly managed. Runoff is rapid, and infiltration is slow. Most of the original surface layer is eroded away, tilth is poor, and organic-matter content is very low.

These soils are or have been used mainly for cultivated crops and pasture. The severe erosion, however, limits suitability mainly to grasses and legumes or trees. Capability unit IVe–1; woodland suitability group 2o1; wildlife group 1; recreation group 3.

Sylvan soils, 12 to 18 percent slopes, severely eroded (19E3).—In most places this mapping unit is on short sides or at upper ends of valleys between less sloping ridgetops and nearly level bottom lands or drainageways. In a few places it occupies the upper part of the slope above soils formed in till or shale. Areas are mostly less than 5 acres in size, but a few are more than 18 acres. The profiles of these soils are similar to the one described as representative of the series, but the surface layer is mainly the dark yellowish-brown silty clay loam subsoil.

Included with these soils in mapping are a few areas of less productive soils where calcareous loess crops out. Included are small areas of less productive Atlas soils. Also included are areas of Fayette soils and soils similar to Sylvan soils that are not calcareous at a depth above 40 inches, both of which are more productive.

These soils are subject to further erosion if slopes are improperly managed. Runoff is rapid, and infiltration is slow. Most of the original surface layer is eroded away, tilth is poorer, and organic-matter content is very low.

These soils are or have been used mainly for cultivated crops and pasture. The moderately steep slopes and severe erosion, however, limit their suitability mostly to grasses and legumes or trees. Capability unit VIe–1; woodland suitability group 2r2; wildlife group 2; recreation group 4.

Sylvan soils, 18 to 30 percent slopes, severely eroded (19F3).—In most places this mapping unit is on sides or at upper ends of valleys, commonly between less sloping ridgetops and nearly level bottom lands or drainageways. Most areas are less than 5 acres in size, but a few are more than 16 acres. The profiles of these

soils are similar to the one described as representative of the series, but the surface layer is mainly the dark yellowish-brown silty clay loam subsoil.

Included with these soils in mapping are a few areas of less productive soils where calcareous loess crops out. Included are a few small areas of less productive Atlas soils. Also included are areas of more productive soils that are similar to Sylvan soils and not calcareous at a depth above 40 inches.

These soils are subject to further erosion if slopes are improperly managed. Runoff is rapid, and infiltration is slow. Most of the original surface layer is eroded away, tilth is poorer and organic-matter content is very low.

These soils are or have been used mainly for cultivated crops and pasture. The steep slopes and severe erosion, however, limit their suitability mainly to grasses and legumes or trees. Capability unit VIe–1; woodland suitability group 2r2; wildlife group 3; recreation group 4.

Sylvan-Bold silt loams, 18 to 60 percent slopes (962F).—In most places this mapping unit is on sides or at upper ends of valleys, commonly between less sloping ridgetops and nearly level bottom lands or drainageways. It is about 70 percent Sylvan silt loam and about 30 percent Bold silt loam. On most slopes Sylvan soils are below Bold soils. Commonly, Sylvan soils occupy 75 to 95 percent of slopes adjacent to small tributaries, but Bold soils occupy as much as 75 percent of slopes that face larger stream valleys. Most areas are less than 10 acres in size, but a few are more than 35 acres. The Bold soil has the profile described as representative of the Bold series. The Sylvan soil has a profile similar to the one described as representative of the Sylvan series, but the subsoil is thinner.

Included with these soils in mapping are a few areas of more productive Fayette soils. In some areas the surface layer has been removed by erosion and highly calcareous yellowish loess is exposed. These areas are indicated on the soil map by a spot symbol. It is difficult to establish vegetation and control erosion in these eroded areas.

These soils are subject to severe erosion if slopes are improperly managed. The organic-matter content is moderately low to low.

These soils are used mainly for permanent pasture and timber and are better suited to this use than to most others. Capability unit VIe–1; woodland suitability group 2r2; wildlife group 3; recreation group 4.

Tama Series

The Tama series consists of well-drained, nearly level to strongly sloping soils on uplands. These soils formed in deep loess under natural grass vegetation.

In a representative profile the surface layer is mainly black silt loam about 20 inches thick. The subsoil is silty clay loam about 38 inches thick. The upper 20 inches of it is brown to dark brown, and the lower 18 inches is dark grayish brown and grayish brown and is mottled with yellowish brown. The underlying material is light brownish-gray light silty clay loam.

Tama soils are moderately permeable and have very high available water capacity. They are suited to the cultivated crops commonly grown if erosion is controlled. They are well suited to the commonly grown grasses and legumes.

Representative profile of Tama silt loam, 0 to 2 percent slopes, 600 feet east of tall concrete stave silo on ridgetop apex approximately 600 feet wide in the southwest corner of SE¼SW¼NW¼ sec. 24, T. 16 N., R. 3 W.

Ap—0 to 9 inches, black (10YR 2/1) heavy silt loam; weak, medium, granular structure; friable; many roots; slightly acid; abrupt, smooth boundary.

A12—9 to 15 inches, black (10YR 2/1) and very dark brown (10YR 2/2) light silty clay loam; moderate, medium, angular blocky structure; friable; compacted; many roots; slightly acid; abrupt, smooth boundary because of compaction.

A3—15 to 20 inches, very dark gray (10YR 3/1) light silty clay loam; moderate, medium, granular structure; friable; many roots; slightly acid; clear, smooth boundary.

B21t—20 to 25 inches, brown to dark-brown (10YR 4/3) medium silty clay loam; weak, medium, subangular blocky structure parting to weak, fine, subangular blocky; friable; some very dark gray (10YR 3/1) along root channels; common roots; medium acid; clear, smooth boundary.

B22t—25 to 31 inches, brown (10YR 4/3) medium silty clay loam; moderate, medium, prismatic structure parting to moderate and strong, fine, subangular blocky; firm; brown and dark-brown (10YR 4/3) clay films on faces of peds; common roots; strongly acid; clear, smooth boundary.

B23t—31 to 40 inches, brown to dark-brown (10YR 4/3) medium silty clay loam; common, fine, distinct, yellowish-brown (10YR 5/4 to 5/6) mottles; weak, medium, prismatic structure parting to moderate and strong, medium, subangular blocky; firm; grainy grayish-brown (10YR 5/2) coatings and continuous brown to dark-brown (10YR 4/3) to dark grayish-brown (10YR 4/2) clay films on faces of peds; common roots; strongly acid; clear, smooth boundary.

B24t—40 to 46 inches, dark grayish-brown (10YR 4/2) and grayish-brown (10YR 5/2) light silty clay loam; many, fine, distinct, yellowish-brown (10YR 5/4 to 5/6) mottles; weak, coarse, angular blocky structure parting to weak and moderate, medium, angular blocky; firm; brown to dark grayish-brown (10YR 4/3 to 4/2) clay films continuous on vertical faces of peds and discontinuous on horizontal faces; few roots; strongly acid; clear, smooth boundary.

B3—46 to 58 inches, grayish-brown (10YR 5/2) light silty clay loam; many, fine and medium, distinct, yellowish-brown (10YR 5/6) mottles; weak, coarse, subangular blocky structure; firm; discontinuous brown and dark-brown (10YR 4/3) to dark grayish-brown (10YR 4/2) clay films on faces of peds; few roots; medium acid; clear, smooth boundary.

C—58 to 60 inches, light brownish-gray (10YR 6/2) light silty clay loam; massive; friable; common concretions; medium acid; gradual, smooth boundary.

The solum ranges from 40 to 60 inches in thickness. The A horizon ranges from 10 to 20 inches in thickness. It is silt loam and light silty clay loam. The silty clay loam B horizon ranges from 30 to 40 inches in thickness. The light silty clay loam C horizon ranges from medium acid to moderately alkaline.

Mapping units 36C2 and 36D2 are outside the range defined for the series because their surface layer is less than 10 inches thick and the B horizon is mottled and grayish at a depth above 40 inches. These differences do

not significantly alter the use and management of the soils.

Tama soils are in a soil pattern with Muscatine and Elkhart soils. They are better drained than Muscatine soils. Their solum is thicker than that of Elkhart soils.

Tama silt loam, 0 to 2 percent slopes (36A).—In most places this soil is on ridgetops and low knolls, and it tends to finger between more sloping drainageways. Areas are irregularly shaped. Most are less than 10 acres in size, but a few are more than 30 acres. This soil has the profile described as representative of the series.

Included with this soil in mapping are areas of less productive, poorly drained Denny soils that are about 1 acre in size and are indicated on the soil map by a spot symbol.

This soil is high in content of organic matter.

This soil is used mainly for cultivated crops, but it is well suited to all crops commonly grown in the county. Capability unit I–1; woodland suitability group 1o1; wildlife group 1; recreation group 1.

Tama silt loam, 2 to 6 percent slopes (36B).—In most places this soil is on convex ridgetops. Some areas finger between and around more sloping drainageways, and some are at the crest of more sloping side slopes. Areas are irregularly shaped. Most are less than 15 acres in size, but a few are more than 60 acres.

Included with this soil in mapping are areas of less productive, poorly drained Denny soils that are about 1 acre in size and are indicated on the soil map by a spot symbol.

This soil is subject to erosion if slopes are improperly managed. The organic-matter content is moderate.

This soil is used mainly for cultivated crops but is well suited to all crops commonly grown in the county. In some places it is used for urban development and is well suited to this use. Capability unit IIe–1; woodland suitability group 1o1; wildlife group 1; recreation group 1.

Tama silt loam, 4 to 7 percent slopes, eroded (36C2).—This soil is at the upper ends of valleys and on narrow convex ridgetops. Most areas are less than 10 acres in size, but a few are more than 30 acres. The profile of this soil is similar to the one described as representative of the series, but in most places the dark-colored surface layer is about 10 to 14 inches thinner and some brownish silty clay loam subsoil material is mixed with it.

Included with this soil in mapping are severely eroded areas that are less than 1 acre in size and are indicated on the soil map by a spot symbol. These areas have increased runoff, undesirable tilth, and low organic-matter content. Also included are minor areas of uneroded Tama soils that have slopes of less than 4 percent.

This soil is subject to severe erosion if slopes are improperly managed. The organic-matter content is moderate to moderately low.

This soil is used mainly for cultivated crops. If properly managed, it is suited to all crops commonly grown in the county. Capability unit IIe–1; woodland suitability group 1o1; wildlife group 1; recreation group 1.

Tama silt loam, 7 to 12 percent slopes, eroded (36D2).—In most places this soil is on sides or at the upper ends of valleys below less sloping ridgetops. Most areas are less than 10 acres in size, but a few are more than 50 acres. The profile of this soil is similar to the one described as representative of the series, but in most places the dark-colored surface layer is about 10 to 14 inches thinner and brownish silty clay loam subsoil material is mixed with it.

Included with this soil in mapping are severely eroded areas that are less than 1 acre in size and are indicated on the soil map by a spot symbol. These areas have increased runoff, poor tilth, and low organic-matter content. Also included are a few areas of a soil similar to Port Byron silt loam in Edgington and Buffalo Prairie Townships. This soil can only be used for ponds because it does not contain sufficient clay for adequate compaction.

This soil is subject to severe erosion if slopes are improperly managed. The organic-matter content is moderate to moderately low.

This soil is used mainly for cultivated crops. If properly managed, it is suited to all crops commonly grown in the county. Capability unit IIIe–1; woodland suitability group 1o1; wildlife group 1; recreation group 3.

Tell Series

The Tell series consists of well-drained, moderately sloping to steep soils on uplands. These soils formed in silty material and in the underlying sandy deposit under native timber vegetation.

In a representative profile the surface layer is very dark gray slit loam about 6 inches thick. The subsurface layer is brown to dark-brown silt loam about 4 inches thick. The subsoil is about 20 inches thick. The upper 15 inches of it is dark yellowish-brown silt loam, and the lower 5 inches is brown heavy sandy loam. The underlying material is mainly stratified yellowish-brown fine sand and loamy fine sand.

Tell soils are moderately permeable and have moderate available water capacity. They are somewhat droughty.

These soils are suited to all crops commonly grown in the county, but they are better suited to drought-resistant crops than to most others.

Tell soils in this county are mapped only in undifferentiated groups with Lamont and Bloomfield soils.

Representative profile of Tell silt loam in an area of Lamont, Tell, and Bloomfield soils, 12 to 30 percent slopes, eroded, approximately 750 feet north of east-west road and 500 feet west of north-south road in the northwest corner of the SE¼SW¼NW¼ sec, 17, T. 16 N., R. 5 W.

Ap—0 to 6 inches, very dark gray (10YR 3/1) silt loam and visible sand grains, light brownish gray (10YR 6/2) dry; moderate, fine and very fine, granular structure in upper part and moderate, medium, platy with plates coated with silt in lower part; friable; neutral; abrupt, smooth boundary.

A2—6 to 10 inches, brown to dark-brown (10YR 4/3) silt loam and common sand grains, light yellowish brown (10YR 6/4) dry; moderate, medium, platy structure parting to moderate, very fine, subangular blocky; friable; medium acid; clear, smooth boundary.

B21—10 to 17 inches, dark yellowish-brown (10YR 4/4) silt loam, light yellowish-brown (10YR 6/4) dry; weak, fine, subangular blocky structure; uncoated silt grains on faces of peds; friable; medium acid; clear, smooth boundary.

B22t—17 to 25 inches, dark yellowish-brown (10YR 4/4) heavy silt loam and common sand grains; moderate, fine, angular blocky and subangular blocky structure; very thin patchy clay films and silt grains on faces of peds; friable; strongly acid; clear, smooth boundary.

IIB3—25 to 30 inches, brown (10YR 4/3) heavy sandy loam; weak, coarse and medium, subangular blocky structure; few very thin clay films on vertical faces of peds; friable; strongly acid; clear, smooth boundary.

IIC1—30 to 46 inches, light yellowish-brown (10YR 6/4) fine sand, single grained; noncoherent; strongly acid; abrupt, smooth boundary.

IIC2—46 to 50 inches;, yellowish-brown (10YR 5/4) loamy fine sand; common, medium, faint, yellowish-brown (10YR 5/8) mottles; single grained, and verk weak, medium, granular structure; very friable; strongly acid; abrupt, smooth boundary.

IIC3—50 to 56 inches, yellowish-brown (10YR 5/4) loamy fine sand; single grained; noncoherent; strongly acid; abrupt, smooth boundary.

IIC4—56 to 68 inches, multicolored loamy fine sand; massive, breaking to single grained; very friable; weakly indurated iron bands and horizontal cleavage; strongly acid.

The solum ranges from 20 to 36 inches in thickness. In undisturbed areas the silt loam A horizon is 5 to 15 inches thick. Some undisturbed areas have an A1 horizon that is less than 6 inches thick and ranges from very dark gray (10YR 3/1) to very dark grayish brown (10YR 3/2). The silty B horizon is silt loam or heavy silt loam and is 15 to 30 inches thick. The IIB horizon is sandy loam and loam. The IIC horizon is commonly stratified and ranges from sand to loamy fine sand. It ranges from strongly acid to neutral.

The upper part of the solum has a higher sand content than defined in the range for the series, but this difference does not alter the usefulness or behavior of the soils.

Tell soils are associated with Lamont and Bloomfield soils. They have more clay and less sand than those soils.

Timula Series

The Timula series consists of well-drained, strongly sloping to steep soils on uplands. These soils formed in deep loess under native timber vegetation.

In a representative profile the surface layer is mainly dark grayish-brown silt loam about 7 inches thick. The subsoil is yellowish-brown silt loam about 13 inches thick. The underlying material is yellowish-brown, calcareous silt.

Timula soils are moderately permeable and have high available water capacity. The high content of natural lime in the underlying material decreases the amount of available phosphate and potash.

These soils are suited to the cultivated crops commonly grown if erosion is controlled. They are well suited to the commonly grown grasses and legumes.

Timula soils in this county are mapped only in complexes with Seaton soils.

Representative profile of Timula silt loam in an area of Seaton-Timula silt loams, 7 to 12 percent slopes, eroded, 141 feet east of post on west side of field entrance along east-west fence and 31 feet south of fence in the northwest corner of NW¼NE¼NW¼ sec. 30, T. 19 N., R. 3 E.

Ap—0 to 7 inches, dark grayish-brown (10YR 4/2) and yellowish-brown (10YR 5/4) silt loam; compact in place parting to moderate, very fine and fine, granular structure; friable; neutral; abrupt, smooth boundary.

B2—7 to 16 inches, yellowish-brown (10YR 5/6) silt loam; weak, medium, prismatic structure parting to weak, medium, subangular blocky; friable; mildly alkaline; clear, smooth boundary.

B3—16 to 20 inches, yellowish-brown (10YR 5/4) silt loam; weak, medium, prismatic structure parting to weak, medium, subangular blocky; very friable; mildly alkaline; slightly effervescent; clear, smooth boundary.

C—20 to 50 inches, yellowish-brown (10YR 5/4) silt; massive; occasional pale-brown (10YR 6/3) calcium spots; moderately alkaline; violently effervescent.

The solum ranges from 20 to 40 inches in thickness. In undisturbed areas the A horizon is silt loam and is 5 to 12 inches thick. In some undisturbed areas the A1 horizon is less than 6 inches thick and ranges from very dark gray (10YR 3/1) to very dark grayish brown (10YR 3/2). The silt loam B horizon is 10 to 20 inches thick. The C horizon is silt or silt loam and is mildly alkaline or moderately alkaline.

Timula soils formed in thick loess, as did Sylvan and Seaton soils. They have less clay in the B horizon than Sylvan soils. They have a thinner solum than Seaton soils.

Trempealeau Series

The Trempealeau series consists of well-drained, nearly level to gently sloping soils on terraces. These soils formed in reddish loamy material and in the underlying sand. The native vegetation was prairie grass.

In a representative profile the surface layer is very dark grayish-brown silt loam about 10 inches thick. The subsoil is about 24 inches thick. The upper 9 inches of it is dark reddish-brown heavy loam, the next 7 inches is reddish-brown sandy clay loam, and the lower 8 inches is dark reddish-brown loamy sand. The underlying material is brown, dark-brown, and dark reddish-brown sand and fine gravel.

Trempealeau soils are moderately to moderately rapidly permeable and have moderate available water capacity. They are somewhat droughty.

These soils are suited to all crops commonly grown in the county, but they are better suited to drought-resistant crops than to most others.

Representative profile of Trempealeau silt loam, 0 to 4 percent slopes, 660 feet south and 490 feet east of the northwest corner of sec. 8, T. 20 N., R. 2 E.

A1—0 to 10 inches, very dark grayish-brown (10YR 3/2) silt loam; moderate, fine and medium, subangular blocky structure parting to moderate, fine and medium, granular; friable; neutral; clear, smooth boundary.

B21t—10 to 19 inches, dark reddish-brown (5YR 3/4) heavy loam; thin, continuous, dark reddish-brown (5YR 3/3) clay films on faces of peds; weak, fine, prismatic structure parting to moderate, fine and medium, subangular blocky; firm; strongly acid; clear, smooth boundary.

B22t—19 to 26 inches, reddish-brown (5YR 4/4) sandy clay loam; thin, discontinuous, dark reddish-brown (5YR 3/4) clay films on faces of peds; moderate, medium, prismatic structure parting to moderate, medium, subangular blocky; firm; strongly acid; clear, smooth boundary.

IIB3t—26 to 34 inches, dark reddish-brown (5YR 3/4) loamy sand; weak, coarse, subangular blocky structure; friable; strongly acid; gradual, smooth boundary.

IIC—34 to 60 inches, brown and dark-brown (10YR 4/3), brown (10YR 5/3), and dark reddish-brown (5YR 3/4) medium and coarse sand and fine gravel; single grained; medium acid.

The solum ranges from 20 to 40 inches in thickness. The A horizon is 10 to 20 inches thick and ranges from silt loam to loam. The reddish loamy upper part of the B horizon ranges from heavy loam to sandy clay loam and is 10 to 30 inches thick. In places a reddish IIB horizon ranges from sandy loam to loamy sand. The IIC horizon ranges from reddish to brownish and is loamy sand or sand and fine gravel.

Trempealeau soils are on terraces, as are Waukee and Dickinson soils. They have a redder B horizon than Waukee or Dickinson soils. They have less sand and more clay in the B horizon than Dickinson soils.

Trempealeau silt loam, 0 to 4 percent slopes (765A).—This nearly level to gently sloping soil is in areas that are in no apparent pattern and are irregularly shaped. Most areas are less than 10 acres in size, but a few are more than 40 acres.

Included with this soil in mapping are severely eroded areas that are less than 1 acre in size and less productive sandy areas that are about 1 acre in size. Both of these areas are indicated on the soil map by spot symbols.

This soil is subject to erosion in gently sloping areas. It is somewhat droughty during seasonally dry periods. The organic-matter content is moderate.

This soil is used mainly for the cultivated crops commonly grown, but if irrigated it is suited to specialty crops. Capability unit IIs–2; woodland suitability group 2o1; wildlife group 1; recreation group 1.

Velma Series

The Velma series consists of moderately steep, moderately well to well drained soils on uplands. These soils formed mainly in loamy glacial till under native prairie grasses.

In a representative profile the surface layer is mainly very dark gray heavy silt loam about 17 inches thick. The subsoil is mainly yellowish-brown clay loam about 39 inches thick. The underlying material is mostly grayish-brown loam mottled with yellowish brown.

Velma soils are moderately permeable and have high available water capacity. They are suited to the cultivated crops commonly grown if erosion is controlled. They are well suited to the commonly grown grasses and legumes.

Representative profile of Velma silt loam, uneroded, in an area of Velma-Coatsburg silt loams, 12 to 18 percent slopes, eroded, in northwest corner of the NW¼-SE¼SE¼ sec. 34, T. 16 N., R. 3 W.

Ap—0 to 8 inches, very dark gray (10YR 3/1) heavy silt loam, very dark gray (10YR 3/1) and dark gray (10YR 4/1) dry; moderate, very fine to medium, granular structure; friable; few sand grains; neutral; abrupt, smooth boundary.

A12—8 to 14 inches, mixed very dark gray (10YR 3/1), brown and dark-brown (10YR 4/3), and some dark-gray (10YR 4/1) heavy silt loam; moderate, medium, granular structure; friable; few sand grains; strongly acid; clear, smooth boundary.

A3—14 to 17 inches, mixed brown to dark-brown (10YR 4/3), yellowish-brown (10YR 5/6), and some very dark gray (10YR 3/1) heavy silt loam; moderate, medium and coarse, granular structure; friable; few sand grains and pebbles; strongly acid; clear, smooth boundary.

IIB21t—17 to 22 inches, yellowish-brown (10YR 5/4) light clay loam; moderate, medium and coarse, subangular blocky structure; friable; some dark-brown (10YR 4/3) worm casts, root channel fillings, and discontinuous clay films on faces of peds; few glacial pebbles; strongly acid; clear, smooth boundary.

IIB22t—22 to 33 inches, yellowish-brown (10YR 5/4) clay loam; thin, continuous, brown (10YR 5/3) clay films on faces of peds; moderate, medium and coarse, subangular blocky structure; friable; a few dark grayish-brown (10YR 4/2) channel fillings; few glacial pebbles, medium acid; clear, smooth boundary.

IIB23t—33 to 51 inches, yellowish-brown (10YR 5/4) light clay loam; thin, continuous, brown (10YR 5/3) clay films on faces of peds; moderate, medium and coarse, subangular blocky structure; firm; few root channels; many iron-manganese concretions; few glacial pebbles; neutral; gradual, smooth boundary.

IIB3t—51 to 56 inches, yellowish-brown (10YR 54) light clay loam; few, fine, prominent, yellowish-brown (10YR 5/6 and 10YR 5/8) mottles; thin, discontinuous, brown (10YR 5/3) clay films on faces of peds; weak, coarse, subangular blocky structure; firm; few root channel fillings; few glacial pebbles; numerous iron-manganese concretions; neutral; clear, smooth boundary.

IIC—56 to 63 inches, grayish-brown (10YR 5/2) and yellowish-brown (10YR 5/4) loam; few, fine, prominent, yellowish-brown (10YR 5/6 and 10YR 5/8) mottles; many glacial pebbles; massive; firm; few black (N 2/0) iron-manganese concretions; moderately alkaline; strongly effervescent.

The solum ranges from 48 to 72 inches in thickness. The loess cap is up to 18 inches thick. The A horizon is 10 to 17 inches thick. It commonly is silt loam or loam, but in some places the lower part is light silty clay loam or light clay loam. In places, the upper 10 inches of the B horizon is silty clay loam formed in loess. The part of the B horizon that formed in glacial till is commonly clay loam, but ranges to heavy clay loam in shaly areas. The lower part of the B horizon is commonly neutral, but ranges from slightly acid to moderately alkaline.

Velma soils are on uplands, as are Hickory and Coatsburg soils. They have a thicker dark-colored A horizon than Hickory soils. They are better drained and have a lower clay content in the B horizon than Coatsburg soils.

Velma silt loam, 12 to 18 percent slopes (250E).—In most places this soil is on valley sides, commonly between the less sloping ridgetops and the nearly level bottom land or drainageways. Most areas are less than 10 acres in size. This soil has a profile similar to the one described as representative of the series.

Included with this soil in mapping are a few areas of soils, on the upper parts of slopes, that have 20 to 40 inches of loess over fine-textured material and that are less permeable and have a lower available water capacity than this Velma soil. Also included are a few areas of Velma soils where slopes are as much as 25 percent, a small acreage of Velma silt loam where slopes are 7 to 12 percent, and areas of an eroded Velma silt loam where slopes are 7 to 18 percent. Included in some less sloping areas is Tama silt loam, which is more permeable and has a higher available water capacity than this Velma soil.

This soil is subject to erosion if slopes are improperly managed. The organic-matter content is moderate.

This soil is used mainly for cultivated crops. The erosion hazard and the moderately steep slopes, how-

ever, limit its suitability mainly to grasses and legumes or trees. Capability unit IVe–1; woodland suitability group 1r2; wildlife group 2; recreation group 4.

Velma-Coatsburg silt loams, 12 to 18 percent slopes, eroded (944E2).—In most places this mapping unit is on valley sides, commonly between the less sloping ridgetops and the bottom land or drainageways. It is about 60 percent Velma silt loam and 40 percent Coatsburg silt loam. Velma soils commonly occupy the lower and middle parts of the slope, and Coatsburg soils the upper part. Areas are less than 10 acres in size. The Coatsburg soil has a profile similar to the one described as representative of the Coatsburg series. The Velma soil has the profile described as representative of the series, but in most places the dark-colored surface layer is thinner and is mixed with some of the subsoil.

Included with these soils in mapping are a few areas of soils, on the upper parts of slopes, that have 20 to 40 inches of loess over fine-textured material and a few areas near the heads of valleys and on opposite slopes of silty Elkhart soils. In places are areas of eroded Hickory and Atlas soils, which have less organic matter in the surface layer than the eroded Velma or Coatsburg soils. Also included is a small acreage of eroded Velma and Coatsburg silt loams where slopes are 7 to 12 percent; some areas where these soils are not eroded and slopes are 7 to 18 percent; and areas on the upper parts of the lesser slopes, of Tama soils, which are more permeable and have a higher available water capacity than Velma and Coatsburg soils.

These soils are subject to severe erosion if slopes are improperly managed. In places specially designed drainage systems are needed to control hillside seepage. The organic-matter content is moderate.

These soils are used mainly for cultivated and forage crops. The severe hazard of erosion and the moderately steep slopes, however, limit their suitability to grasses and legumes or trees. Capability unit VIe–2; woodland suitability group 3r2; wildlife group 2; recreation group 4.

Wabash Series

The Wabash series consists of very poorly drained, nearly level soils on bottom lands. These soils formed in clayey alluvium.

In a representative profile the surface layer is black silty clay about 15 inches thick. The subsoil is black and dark-gray clay about 25 inches thick. The underlying material is dark-gray and olive clay loam.

Wabash soils are very slowly permeable and have moderate available water capacity.

These soils are better suited to crops tolerant of a seasonally high water table and a clayey surface layer and subsoil than to most others.

Representative profile of Wabash silty clay, 65 feet north of culvert in drainage ditch and 97 feet west of ditch in the southwest corner of NW¼SE¼SE¼ sec. 36, T. 16 N., R. 6 W.

Ap—0 to 6 inches, black (N 2/0) light silty clay; compact in place parting to moderate, medium and coarse, subangular blocky and angular blocky structure; firm; neutral; abrupt, smooth boundary.

A12—6 to 15 inches, black (N 2/0) silty clay; moderate, medium and coarse, subangular blocky and angular blocky structure; firm; neutral; clear, smooth boundary.

B2g—15 to 32 inches, black (N 2/0) light clay; olive (5Y 4/4) root linings in lower part; moderate, medium, prismatic structure parting to moderate, coarse, subangular blocky; firm; neutral; clear, smooth boundary.

B3g—32 to 40 inches, mixed black (N 2/0) and dark-gray (5Y 4/1) light clay; many, fine, distinct, olive (5Y 4/4) mottles and many, fine, prominent, brownish-yellow (10YR 6/8) mottles; common, fine, prominent, white (10YR 8/1) mottles lining root channels; weak, medium, prismatic structure parting to moderate, medium, subangular blocky; firm; neutral; abrupt, smooth boundary.

Cg—40 to 63 inches, dark-gray (10YR 4/1), olive-brown (2.5Y 4/4), olive-gray (5Y 5/2), and olive (5Y 5/3) clay loam; many, fine, faint, olive (5Y 4/4) mottles, many, fine, distinct, brownish-yellow (10YR 6/8) mottles and common, fine, distinct, white (10YR 8/1) mottles lining root channels; massive tending to weak, coarse, subangular blocky structure in upper half of horizon; firm; snail shells abundant in upper half of horizon and a few in lower part; moderately alkaline; strongly effervescent.

The solum is 40 to 60 inches thick and ranges from slightly acid to mildly alkaline. The black to very dark gray horizons range from 24 to 40 inches in thickness. The A and B horizons are silty clay and clay. The gleyed C horizon is clay loam or silty clay loam. It ranges from neutral to moderately alkaline.

Wabash soils formed in clayey deposits, as did Niota and Montgomery soils. They have a thicker dark-colored A horizon than Montgomery soils. They do not have the A2 horizon common to Niota soils.

Wabash silty clay (83).—This nearly level soil is in areas within broad flood plains, mainly in one of the lowest positions in the landscape. Areas are irregularly shaped. Some are less than 20 acres in size, but others are more than 600 acres.

Included with this soil in mapping are several areas where snail shells cause the soil to have a high lime content. The high content of natural lime decreases the amount of available phosphate and potash, and annual fertilizer application, based on the needs of the crop, is required in these areas.

Frequently the water table is high in this soil. Flooding is a hazard on unprotected bottom lands. The high content of clay in the surface soil causes very poor workability. The organic-matter content is high.

This soil is used mainly for cultivated crops, but it is better suited to crops tolerant of a seasonally high water table and a clayey surface layer and subsoil. The degree of suitability for any use in areas subject to overflow depends on the frequency and duration of flooding. Capability unit IIIw–1; woodland suitability group 2w6; wildlife group 6; recreation group 8.

Waukee Series

The Waukee series consists of well-drained, nearly level to gently sloping soils on terraces. These soils formed in loamy material and in the underlying sandy deposit under native prairie vegetation.

In a representative profile the surface layer is mainly very dark gray loam about 18 inches thick. The subsoil is about 19 inches thick. The upper 15 inches of it is

mainly dark yellowish-brown loam, and the lower 4 inches is dark yellowish-brown fine sandy loam. The underlying material is brown and yellowish-brown loamy fine sand.

Waukee soils are moderately permeable and have moderate available water capacity. They are somewhat droughty.

These soils are suited to all crops commonly grown in the county, but they are better suited to drought-resistant crops than to most others.

Representative profile of Waukee loam, 0 to 4 percent slopes, 220 feet east along east-west fence from corner of fence that extends south and 397 feet north of east-west fence in the northwest corner of SE¼-SE¼NW¼ sec. 3, T. 20 N., R. 2 E.

Ap—0 to 10 inches, very dark gray (10YR 3/1) loam, grayish brown (10YR 5/2) dry; massive parting to moderate, very fine to medium, granular structure; friable; medium acid; abrupt, smooth boundary.

A3—10 to 18 inches, very dark grayish-brown (10YR 3/2) and very dark gray (10YR 3/1) heavy loam; weak, coarse, subangular blocky structure parting to moderate, very fine to medium, granular; friable; medium acid; clear, smooth boundary.

B21—18 to 26 inches, brown (10YR 4/3) loam; continuous, very dark grayish-brown (10YR 3/2) organic coatings on faces of peds; moderate, medium and coarse, subangular blocky structure; friable; medium acid; clear, smooth boundary.

B22—26 to 33 inches, dark yellowish-brown (10YR 4/4) loam; continuous, dark-brown (10YR 3/3) organic coatings on faces of peds; moderate, medium and coarse, subangular blocky structure; friable; medium acid; clear, smooth boundary.

IIB3—33 to 37 inches, dark yellowish-brown (10YR 4/4) fine sandy loam; discontinuous, dark-brown (10YR 3/3) organic coatings on faces of peds; weak, medium and coarse, subangular blocky structure; very friable; medium acid; abrupt, smooth boundary.

IIC—37 to 60 inches, brown (10YR 4/3) and yellowish-brown (10YR 5/4) loamy fine sand that is massive in place; medium acid.

The solum ranges from 24 to 40 inches in thickness. The A horizon is 10 to 20 inches thick and is loam or silt loam. The loamy upper part of the B horizon is silt loam or loam and 10 to 30 inches thick. In places, a IIB horizon ranges from sandy loam to loamy sand. The IIC horizon ranges from loamy fine sand to sand and fine gravel.

Waukee soils are on terraces, as are Dickinson and Lawler soils. They have less sand in the solum than Dickinson soils. They are better drained than Lawler soils.

Waukee loam, 0 to 4 percent slopes (727A).—This soil is in areas that are in no apparent pattern and are irregularly shaped. Most areas are less than 10 acres in size, but a few are more than 120 acres.

Included with this soil in mapping are small areas of Dickinson soils that are somewhat more droughty and less productive than Waukee soils. Less productive sandy areas that are about 1 acre in size are indicated on the soil map by a spot symbol.

This soil is subject to erosion in gently sloping areas. It is somewhat droughty during seasonally dry periods. The organic-matter content is moderate.

This soil is used mainly for the cultivated crops commonly grown, but if irrigated it is suited to specialty crops. Capability unit IIs–2; woodland suitability group 2o1; wildlife group 1; recreation group 1.

Use and Management of the Soils

This section explains the capability classification used by the Soil Conservation Service. It shows the suitability of the soils for crops and predicts yields for the principal crops under a high level of management. It describes the woodland and the kinds of wildlife in the county. It also evaluates the suitability of the soils for recreational facilities and for highways and other engineering structures.

General Management of Crops and Pasture

About 50 percent of Rock Island County is cultivated. Corn and soybeans are the principal crops. Small grain and forage are also grown.

The main management concerns for cultivated soils in the county are controlling erosion, overcoming the hazard of wetness, protecting from flooding, conserving moisture, and maintaining tilth and fertility.

Measures that help to control erosion are terracing, contour farming, conservation tillage, cover crops, grassed waterways, and use of crop residue. Generally, combinations of several measures are used. Measures that help to overcome wetness are the use of tile drains, shallow surface ditches, inlets to tile drains, drainage ditches, and diversions. Levees protect the soils from flooding. Conserving moisture generally means reducing evaporation, limiting runoff, increasing infiltration, and controlling weeds. Practices that help to conserve moisture are conservation tillage, use of crop residue, contour farming, stripcropping, and use of field windbreaks. Applying chemical fertilizer, green manure, and barnyard manure and including cover crops, grasses, and legumes in the cropping system help to maintain tilth and fertility. Controlling erosion also helps to conserve fertility and maintain tilth. Crops respond well to fertilizer. Lime is needed periodically, especially on most uplands and terraces.

Good management is very important for rotational and permanent pasture. Renovation of pasture land, by applying lime and fertilizer according to the results of soil tests, controlling erosion, preparing a good seedbed, using a combination of adapted legumes and grasses for seeding, controlling weeds, and controlling erosion, is the key to obtaining profitable grazing land.

The soils in capability classes I, II, III, and IV are generally not used for permanent pasture but are used for field crops and rotational pasture. When those soils are used for permanent pasture, and when the pasture is renovated and well managed, good yields generally are obtained.

If renovation is practical, the soils in capability classes V, VI, and VII can be used for permanent pasture. Where complete renovation is not practical, those practices that are practical can be used, or the area should be kept in trees or used for wildlife.

Capability Grouping

Capability grouping shows, in a general way, the suitability of soils for most kinds of field crops. The groups are made according to the limitations of the

soils when used for field crops, the risk of damage when they are used, and the way they respond to treatment. The grouping does not take into account major and generally expensive landforming that would change slope, depth, or other characteristics of the soils; does not take into consideration possible but unlikely major reclamation projects; and does not apply to rice, cranberries, horticultural crops, or other crops requiring special management.

Those familiar with the capability classification can infer from it much about the behavior of soils when used for other purposes, but this classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for forest or for engineering uses.

In the capability system, all kinds of soil are grouped at three levels: the capability class, the subclass, and the unit. These are described in the following paragraphs.

CAPABILITY CLASSES, the broadest groups, are designated by Roman numerals I to VIII. The numerals indicate progressively greater limitations and narrower choices for practical use, defined as follows:

Class I soils have few limitations that restrict their use.

Class II soils have moderate limitations that reduce the choice of plants or require moderate conservation practices.

Class III soils have severe limitations that reduce the choice of plants, require special conservation practices, or both.

Class IV soils have very severe limitations that reduce the choice of plants, require very careful management, or both.

Class V soils are not likely to erode but have other limitations, impractical to remove, that limit their use largely to pasture, range, woodland, or wildlife.

Class VI soils have severe limitations that make them generally unsuited to cultivation and limit their use largely to pasture or range, woodland, or wildlife.

Class VII soils have very severe limitations that make them unsuited to cultivation and that restrict their use largely to pasture or range, woodland, or wildlife.

Class VIII soils and landforms have limitations that preclude their use for commercial plants and restrict their use to recreation, wildlife, water supply, or to esthetic purposes. (None in Rock Island County.)

CAPABILITY SUBCLASSES are soil groups within one class. They are designated by adding a small letter, *e*, *w*, *s*, or *c*, to the class numeral, for example, IIe. The letter *e* shows that the main limitation is risk of erosion unless close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c*, used in only some parts of the United States, shows that the chief limitation is climate that is too cold or too dry. Only subclasses *e*, *w*, and *s* are in Rock Island County.

In class I there are no subclasses, because the soils of this class have few limitations. Class V can contain, at the most, only the subclasses indicated by *w*, *s*, and *c*, because the soils in class V are subject to little or no erosion, although they have other limitations that restrict their use largely to pasture, range, woodland, wildlife habitat, or recreation.

CAPABILITY UNITS are soil units within the subclasses. The soils in one unit are enough alike to be suited to the same crops and pasture plants, to require similar management, and to have similar productivity and other responses to management. Capability units are generally designated by adding an Arabic numeral to the subclass symbol, for example, IIw–1 or IIIe–1. Thus, in one symbol, the Roman numeral designates the capability class, or degree of limitation; the small letter indicates the subclass, or kind of limitation, as defined in the foregoing paragraph; and the Arabic numeral specifically identifies the capability unit within each subclass.

Management by capability units

In the following pages the capability units in Rock Island County are described and use and management is suggested for the soils of each unit. Soils used for cultivated crops generally need lime and fertilizer. The amount to apply on a given soil should be determined by soil tests. The names of soil series represented are mentioned in the description of each capability unit, but this does not mean that all soils of a given series appear in that unit. To find the names of all the soils in any given capability unit, refer to the Guide to Mapping Units at the back of this survey.

CAPABILITY UNIT I–1

This unit consists of nearly level, moderately well drained and well drained soils of the Downs, Joslin, Port Byron, Raddle, Rozetta, and Tama series. The Downs, Port Byron, Rozetta, and Tama soils are on uplands, and the Joslin and Raddle soils are on terraces. They have a surface layer of silt loam and a subsoil of silt loam, silty clay loam, or silty clay. Permeability is moderately slow in the silty clay subsoil of the Joslin soil and moderate in the rest. The available water capacity is high to very high. The organic-matter content is high in the Tama soil and moderate in the rest.

These soils have no major limitations. Maintaining fertility and tilth is the main management need.

The soils in this unit are intensively cultivated in most places. Corn and soybeans are the main crops, and the soils are well suited to them. Small grain and forage are also grown.

CAPABILITY UNIT I–2

This unit consists of nearly level, somewhat poorly drained soils of the Atterberry, Joy, and Muscatine series. These soils are on uplands. They have a surface layer of silt loam and a subsoil of silt loam or silty clay loam. Permeability is moderate to moderately slow, and available water capacity is very high. The organic-matter content is moderate in the Atterberry soil and high in the rest.

These soils have no major limitations. Maintaining fertility and tilth is the main management need. Tile drains reduce wetness in some areas.

The soils in this unit are intensively cultivated in most places. Corn and soybeans are the main crops, and the soils are well suited to them. Small grain and forage are also grown.

CAPABILITY UNIT I-3

This unit consists of nearly level soils of the Coffeen, Dorchester, Lawson, Orion, and Radford series. These soils are on bottom lands. The Dorchester soil is moderately well drained, and the rest are somewhat poorly drained. All have a surface layer of silt loam and a subsoil or subsurface layer of silt loam or silty clay loam. Permeability is moderate, and available water capacity is very high. The organic-matter content is high to moderately low.

These soils have no major limitations. Maintaining fertility and tilth is the main management need. Soils not protected by levees are subject to seasonal flooding. Randomly placed tile drains and shallow surface ditches reduce wetness in some areas. Dorchester soils are naturally high in lime, which reduces the availability of phosphorus and most minor nutrients. Annual application of superphosphate on high lime soils is more readily available to crops than bulk additions.

The soils in this unit are used mainly for corn and soybeans, and they are well suited to this use. Small grain and forage are also grown.

CAPABILITY UNIT IIe-1

This unit consists of gently sloping to moderately sloping, moderately well drained and well drained soils of the Downs, Fayette, Joslin, Martinsville, Port Byron, Raddle, Seaton, Seaton sandy substratum, and Tama series. These soils are on uplands and stream terraces. The surface layer is loam in the Martinsville soil and silt loam in the rest. The subsoil is silty clay loam in Downs, Fayette, and Tama soils; silty clay in the Joslin soil; clay loam in the Martinsville soil; and silt loam in Port Byron, Raddle, Seaton, and Seaton sandy substratum soils. Permeability is moderate to moderately slow in the Joslin soil and moderate in the rest. Available water capacity is high to very high. The organic-matter content is moderately low in Fayette, Martinsville, Seaton, and Seaton sandy substratum soils; moderate in Downs, Joslin, Port Byron, and Raddle soils; and high in the Tama soil. In places Fayette, Martinsville, Seaton, Seaton sandy substratum, and Tama soils are eroded.

The hazard of water erosion is slight on gentle slopes and moderate in more sloping areas. Tilth is hard to maintain in eroded areas, especially where tillage extends into the subsoil.

The soils in this unit are used mainly for corn and soybeans, and they are well suited to this use. Small grain and forage are also grown.

CAPABILITY UNIT IIw-1

This unit consists of nearly level, somewhat poorly drained and poorly drained soils of the Canisteo, Denny, Sable, and Stronghurst series. Canisteo soils are on terraces, and the rest are on uplands. The surface layer is silty clay loam in the Sable soil and silt loam in the rest. The subsoil is silt loam in the Canisteo soil and silty clay loam in the rest. Permeability is moderate in Canisteo and Sable soils; moderate to moderately slow in the Stronghurst soil; and slow in the Denny soil. Available water capacity is high to very high. The organic-matter content is moderately low in the Stronghurst soil, moderate in Canisteo and Denny soils, and high in the Sable soil.

Wetness is the main hazard. The water table is seasonally high. Ponding and slow runoff are limitations in some areas of uplands. Shallow surface ditches and tile drains reduce wetness. The Sable soil is difficult to work, but the rest have good tilth. Fall plowing is a common practice, but soil blowing is a hazard when the surface soil dries out the following spring. The Canisteo soil is high in lime, which reduces the availability of phosphorus and most minor nutrients. Annual application of superphosphate on high lime soils is more readily available to crops than bulk additions.

The soils in this unit are used mainly for corn and soybeans, and they are well suited to this use. Small grain and forage are also grown.

CAPABILITY UNIT IIw-2

This unit consists of nearly level, poorly drained soils of the Calco, Millington, Otter, and Sawmill series. These soils are on bottom lands. They have a surface layer of loam, silt loam, or silty clay loam and a subsoil or subsurface layer of silt loam or silty clay loam. Permeability is moderate to moderately slow, and available water capacity is high to very high. The organic-matter content is high.

Wetness is the main hazard. Flooding is an annual hazard unless the soil is protected by levees. The water table is seasonally high, and some areas receive runoff from uplands. Shallow surface ditches and tile drains reduce wetness. Spring plowing is somewhat difficult on soils that have a surface layer of silty clay loam. Fall plowing is a common practice on these soils, but soil blowing is a hazard when the surface soil dries out the following spring. Maintaining tilth and fertility is the main management need. Calco and Millington soils are naturally high in lime, which reduces the availability of phosphorus and most minor nutrients. Annual application of superphosphate on high lime soils is more readily available to crops than bulk additions.

The soils in this unit are intensively cultivated. Corn and soybeans are the main crops grown, and the soils are well suited to them. Small grain and forage are also grown.

CAPABILITY UNIT IIs-1

Hitt loam, shallow variant, 0 to 4 percent slopes, is the only soil in this unit. It is a well-drained, nearly level to gently sloping soil on terraces. The subsoil is dominantly clay loam. Permeability is moderate, and available water capacity is moderate. The organic-matter content is moderate.

This soil is somewhat droughty. The main limitations are the solid bedrock at a depth of 20 to 40 inches and moderate available water capacity.

This soil is best suited to drought-resistant crops. Corn and soybeans are the main crops. Small grain and forage are also grown.

CAPABILITY UNIT IIs-2

This unit consists of nearly level to gently sloping, well-drained soils of the Coyne, Saude, Trempealeau, and Waukee series. These soils are on stream terraces. They have a surface layer of fine sandy loam, loam, or silt loam. The subsoil is silty clay loam in the Coyne soil and loam in the rest. Permeability is moderate to moderately rapid, and available water capacity is moderate. The organic-matter content is moderate.

These soils are somewhat droughty. The main limitation is the moderate available water capacity. The hazard of soil blowing is a limitation on the Coyne soil. Water erosion is a slight hazard in gently sloping areas.

These soils are best suited to such drought-resistant crops as rye and oats. Corn and soybeans can be grown, but yields are moderate.

CAPABILITY UNIT IIs-3

This unit consists of nearly level, somewhat poorly drained soils of the Hoopeston and Lawler series. These soils are on terraces. The Hoopeston soil has a surface layer and subsoil of sandy loam, and the Lawler soil has a surface layer of loam and subsoil of sandy clay loam. Permeability is moderate to moderately rapid, and available water capacity is moderate to low. The organic-matter content is moderate.

The main limitations are the low to moderate available water capacity and the hazard of soil blowing. These soils are somewhat droughty and have a seasonally high water table. Because they are porous, they do not hold large amounts of plant nutrients. Fertilizer should be applied frequently and in small amounts to reduce the loss through leaching.

These soils are best suited to such drought-resistant crops as rye and oats. Corn and soybeans can be grown, but yields are moderate.

CAPABILITY UNIT IIIe-1

This unit consists of strongly sloping, well-drained, eroded soils of the Elkhart, Fayette, Seaton, Tama, and Timula series. These soils are on uplands. They have a surface layer of silt loam and a subsoil of silt loam or silty clay loam. Permeability is moderate, and available water capacity is high to very high. The organic-matter content is moderate to low.

Water erosion is the main hazard in cultivated areas (fig. 6). Maintaining or improving fertility and tilth is necessary on eroded soils.

The soils in this unit are suited to crops grown in the county, but are not well suited to continuous row crops. Corn, soybeans, small grain, and forage are the main crops.

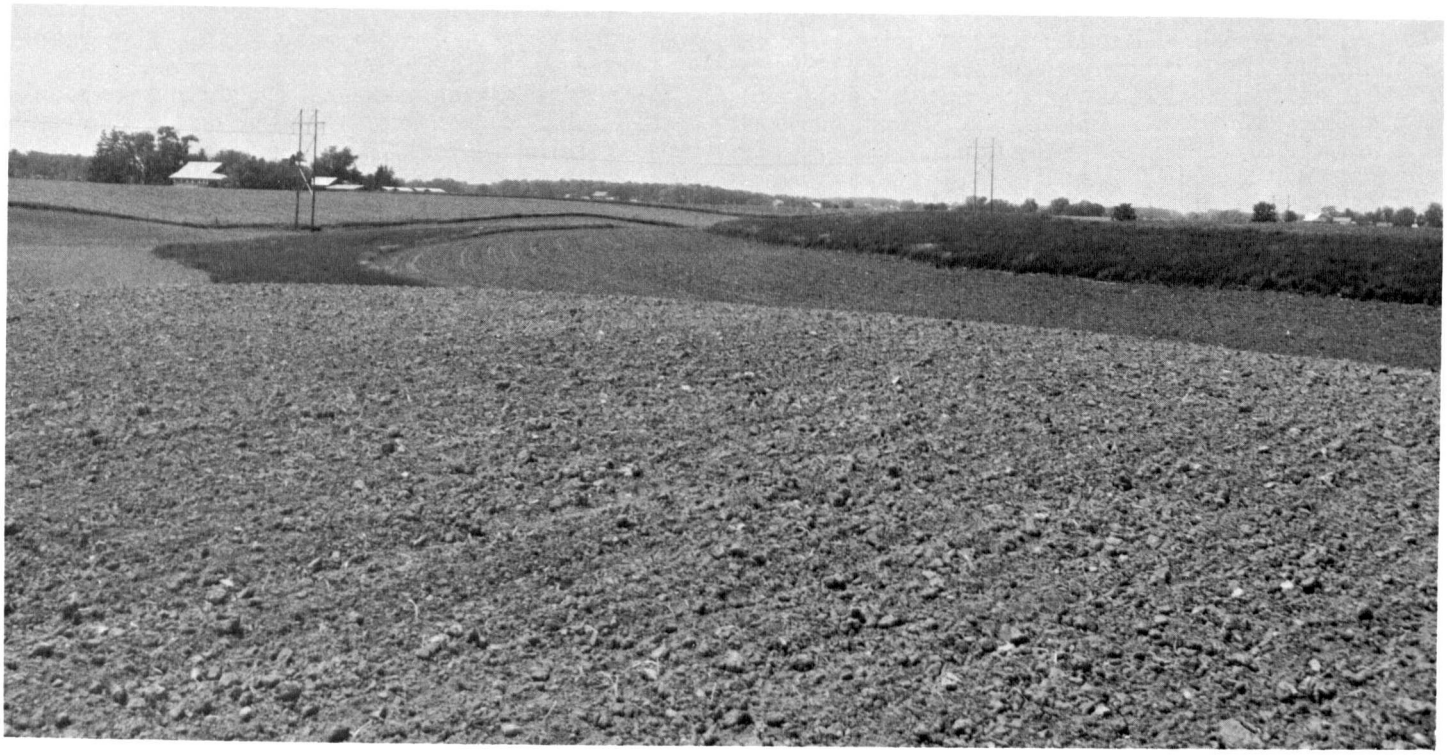


Figure 6.—**A strongly sloping, eroded Fayette silt loam. Contour farming with alternating strips of row crops and grass and legumes is effective in erosion control.**

CAPABILITY UNIT IIIe–2

This unit consists of moderately sloping to strongly sloping, well drained to somewhat excessively drained soils of the Bloomfield, Coyne, Dickinson, Lamont, and Tell series. These soils are on uplands and stream terraces. They have a surface layer of silt loam, sandy loam, fine sandy loam, or fine sand, and a subsoil of silt loam, silty clay loam, sandy loam, fine sandy loam, or fine sand. Permeability is moderate to rapid, and available water capacity is moderate to low. The organic-matter content is low in Bloomfield, Lamont, and Tell soils and moderate in Coyne and Dickinson soils.

The main limitations are the severe hazards of soil blowing and water erosion on improperly managed slopes. The soils are droughty during seasonally dry periods. Because they are porous, they do not hold large amounts of water and plant nutrients. Fertilizer should be applied frequently and in small amounts to reduce the loss through leaching.

The soils in this unit are used mostly for corn, soybeans, small grain, and forage crops and permanent pasture. If irrigated, they are suitable for higher profit crops.

CAPABILITY UNIT IIIw–1

This unit consists of nearly level, poorly drained soils of the Millsdale and Niota series and very poorly drained soils of the Montgomery and Wabash series. The Wabash soil is on bottom lands; and Millsdale, Montgomery, and Niota soils are on stream terraces. They have a surface layer of silt loam, silty clay loam, or silty clay, and a subsoil of silty clay to clay. Permeability is slow to very slow, and available water capacity is moderate to high. The organic-matter content is moderate in the Niota soil and high in the rest.

Wetness is a major hazard. Some low areas of the Wabash soil flood occasionally. Millsdale, Montgomery, and Wabash soils are difficult to work because the content of clay is high. Runoff is slow on all the soils. The water table is normally near the surface in spring, and ponding occasionally occurs. Tile drains do not work well because permeability is slow to very slow. Surface drainage reduces wetness.

Where drained, the soils in this group are used mainly for corn and soybeans, and they are suited to this use. Small grain and forage are also grown.

CAPABILITY UNIT IIIw–2

Only Mixed alluvial land is in this unit. In most places it occurs as nearly level islands and bottom land outside of levees that are adjacent and parallel to the Mississippi and Rock Rivers. It also occupies some nearly level to moderately sloping colluvial positions between the uplands and the bottom lands. It is poorly drained to well drained. The surface layer and subsoil are predominantly silt loam, but the surface layer ranges from silt loam to sand, and the subsoil ranges from silty clay loam or clay loam to sand. Permeability is moderate to rapid, and available water capacity is high to moderate. The organic-matter content ranges from low to high.

Flooding is a major hazard. A seasonal high water table is also a hazard in many areas. Levees reduce flooding in a few areas. Areas in colluvial positions are subject to frequent overflow from adjacent sandy and loamy uplands.

The location of Mixed alluvial land makes protection from flooding impractical. Low-quality trees are growing in most areas outside levees. Wildlife habitat is the best use.

CAPABILITY UNIT IIIs–1

This unit consists of nearly level to gently sloping, somewhat excessively drained to well drained soils of the Burkhardt, Dickinson, and Saude series. These soils are on terraces. The surface layer and subsoil are sandy loam in the Burkhardt and Dickinson soils and loam in the Saude soil. Permeability is moderately rapid to rapid, and available water capacity is moderate to low. The organic-matter content is moderate.

The main limitation is droughtiness. Soil blowing is a hazard in unprotected areas, and water erosion is a slight hazard in gently sloping areas. Because these soils are porous, they do not hold large amounts of plant nutrients. Fertilizer should be applied frequently and in small amounts to reduce the loss through leaching.

The soils of this unit are used mostly for corn, soybeans, small grain, and forage. If irrigated, they are suitable for truck crops.

CAPABILITY UNIT IVe–1

This unit consists of strongly sloping to moderately steep, moderately well drained and well drained soils of the Elkhart, Fayette, Hickory, Martinsville, Seaton, Sylvan, Timula, and Velma series. These soils are on uplands. They have a surface layer and subsoil of silt loam, silty clay loam, or clay loam. Many areas of eroded soils have plow layers that consist mainly of subsoil material. Permeability is moderate, and available water capacity is moderate to very high. The organic-matter content is very low to moderate.

Water erosion is a severe hazard. Slopes limit where these soils can be cultivated. Tilth is hard to maintain, especially in the more eroded areas where tillage extends into the silty clay loam or clay loam subsoil. These eroded areas dry faster than slightly eroded areas. Occasionally, there is insufficient moisture for good seed germination.

The soils in this unit are poorly suited to cultivated crops due to slope and the hazard of erosion. Where erosion is controlled and fertility and tilth are maintained, small grain, forage, corn, and soybeans can be grown. Most slightly eroded soils are either in woodland or pasture.

CAPABLITY UNIT IVs–1

This unit consists of nearly level to strongly sloping, well drained to excessively drained soils of the Landes, Oakville, and Sparta series and Blown-out land. These soils are on uplands, stream terraces, and bottom lands. They have a surface layer of sand, loamy fine sand, or fine sandy loam and a subsoil or subsurface layer of fine sandy loam, fine sand, sand, or sand and gravel. Permeability is moderately rapid to very rapid. Available water capacity is moderate to low in the Landes soil and very low in the rest. The organic-matter content is moderately low to very low.

The main limitations are the very low available water capacity and the low natural fertility. Soil blowing is a major hazard in unprotected areas. Because these soils are porous, they do not hold large amounts of plant nutrients. Fertilizer should be applied frequently and in small amounts to reduce the loss through leaching.

Most of the acreage is in pasture or native cover. Unless irrigated, the soils are poorly suited to cultivated crops commonly grown in the county.

CAPABILITY UNIT Vw

This unit consists of nearly level, poorly drained to very poorly drained soils of the Calco, Millington, Otter, and Sawmill series. These soils are on bottom lands and are wet for long periods. They have a surface layer of silt loam, loam, or silty clay loam and a subsoil of silt loam or silty clay loam. Permeability is moderate to moderately slow, and available water capacity is high to very high. The organic-matter content is high.

The main limitations are the permanent high water table and the ponding from floods.

The soils in this unit are mostly idle, but some areas are used for permanent pasture or woodland. The degree of suitability for pasture and woodland depends on the frequency and duration of ponding.

CAPABILITY UNIT VIe–1

This unit consists of moderately steep to steep, moderately well drained to well drained soils of the Bold, Fayette, Hickory, Martinsville, Seaton, Sylvan, and Timula series. These soils are on uplands. They have a surface layer of silt loam, loam, silty clay loam, or clay loam and a subsoil of silty clay loam, silt loam, or clay loam. Permeability is moderate, and available water capacity is moderate to very high. The organic-matter content is moderately low to very low. Many areas of these soils are severely eroded.

The main limitations are the moderately steep to steep slopes and the severe hazard of water erosion (fig. 7). Water runoff is rapid, especially in areas of eroded soils that have poor vegetation.

The soils in this unit are unsuitable for cultivation, but some areas are still cultivated. They are suited to pasture and woodland. Moderately steep to steep slopes make pasture maintenance and the operation of machinery difficult.

CAPABILITY UNIT VIe–2

This unit consists of strongly sloping to steep, poorly

Figure 7.—**Moderately steep, severely eroded Hickory-Sylvan-Fayette complex. Good pasture or woodland management is needed.**

drained to well-drained soils of the Coatsburg, Hickory, High Gap, and Velma series, and Clayey terrace escarpments. These soils are on uplands and terraces. The surface layer is silty clay loam in the Clayey terrace escarpments and silt loam in the rest. The subsoil is silty clay or clay loam. Permeability is very slow to moderate, and available water capacity is high to moderate. The organic-matter content is low to moderate.

The main limitations are the steep slopes and the severe hazard of water erosion. In some areas, slow permeability and hillside seepage are also limitations. Water runoff is rapid, especially in areas of eroded soils that are poorly vegetated.

The soils in this unit are unsuitable for cultivation, but some areas are still cultivated. They are suitable for pasture and woodland. The steeper slopes make pasture maintenance and the operation of machinery difficult.

CAPABILITY UNIT VIs–1

This unit consists of strongly sloping to steep, well-drained to somewhat excessively drained soils of the Bloomfield, Lamont, Oakville, Seaton, and Tell series and the Gravelly terrace escarpments. The soils are on uplands and terraces. They have a surface layer of silt loam, fine sandy loam, loamy fine sand, fine sand, or gravelly sandy loam. The subsurface layer or subsoil is silt loam, fine sandy loam, fine sand, coarse sand, or gravel. Permeability is moderate to very rapid. Available water capacity is very high in the Seaton soil and very low to moderate in the rest. The organic-matter content is moderately low to very low.

The main limitations are the very low to moderate available water capacity, the low natural fertility, and the slope. The hazard of soil blowing is severe in bare areas in spring. Because the soils are porous, they do not hold large amounts of plant nutrients. Fertilizer should be applied frequently and in small amounts to reduce loss through leaching.

Most of the acreage is in pasture or woodland. The soils are best suited to these uses. Only a few areas are cultivated. Commercial fertilizers can be applied for best pasture production.

CAPABILITY UNIT VIIe–1

This unit consists of steep to very steep, moderately well drained to excessively drained soils of the Chute, Hickory, Strawn, and Sylvan series. These soils are on uplands. The surface layer is fine sand in the Chute soil and silt loam or loam in the rest. The subsoil is silt loam, silty clay loam, clay loam, or fine sand. Permeability is moderate to rapid. Available water capacity is low in the Chute soil and moderate to very high in the rest. The organic-matter content is moderately low to low.

The main limitations are the very steep slopes and the severe hazard of water erosion (fig. 8). Water run-

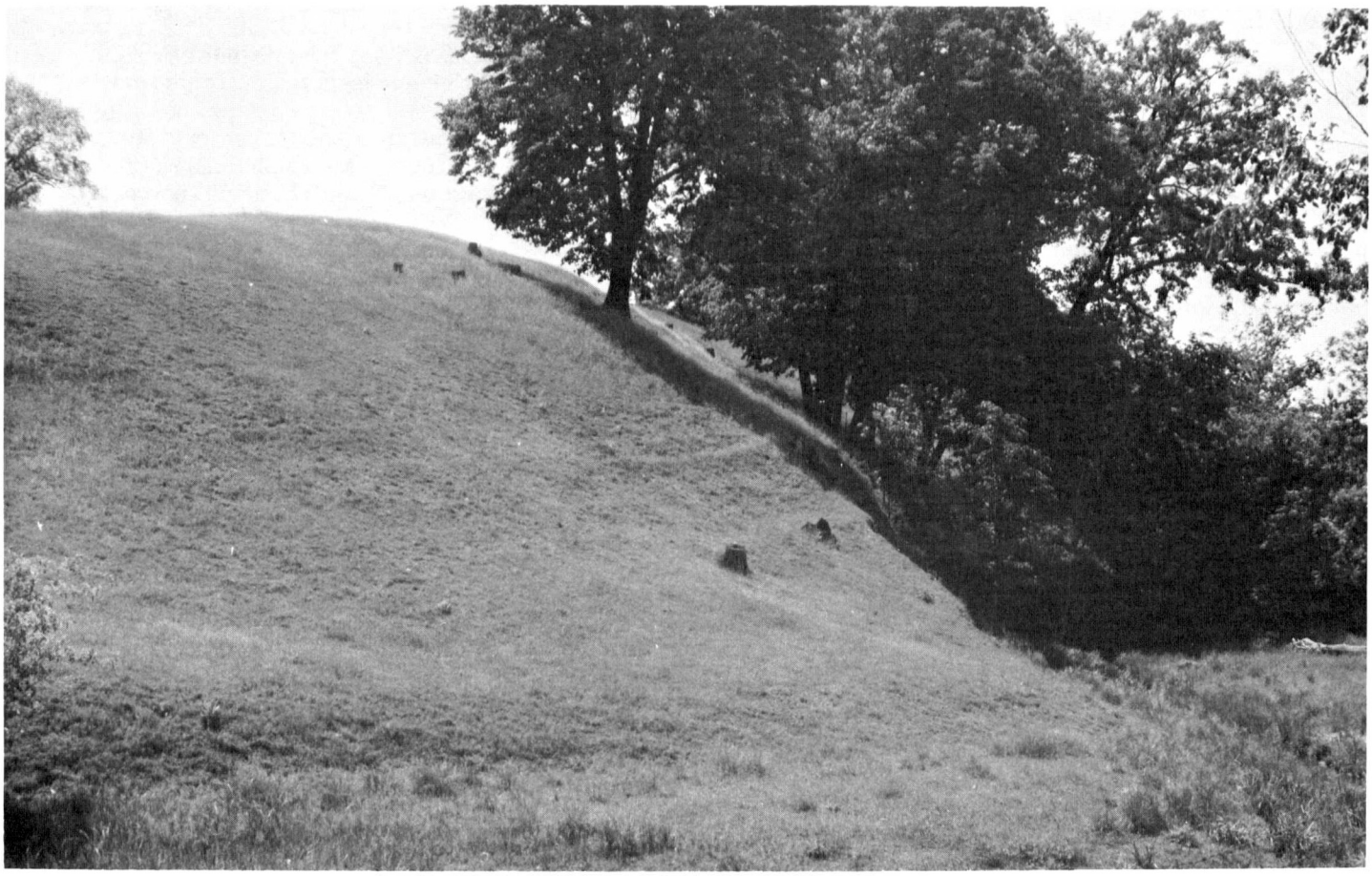


Figure 8.—**Steep to very steep Strawn-Chute complex. Controlled grazing or good woodland management is needed in erosion control.**

off is rapid to very rapid during periods of heavy rainfall. The Chute soil is subject to soil blowing in bare areas. The soils seldom have a reserve supply of moisture.

The soils in this unit are unsuitable for cultivation and are poorly suited to pasture. Excessive grazing on pasture destroys the protective cover and results in excessive erosion. Most of the acreage is in woodland. Generally, the soils are too steep for machinery to be used for liming, fertilizing, seeding, or mowing. They are suited to woodland and wildlife.

CAPABILITY UNIT VIIe–2

This unit consists of moderately steep to very steep, somewhat poorly drained to well-drained soils of the Atlas, Hickory, and High Gap series. These soils are on uplands. They have a surface layer of silt loam and a subsoil of clay loam. Permeability is very slow to moderate, and available water capacity is moderate to high. The organic-matter content is moderately low to very low.

The main limitations are the slope, the severe hazard of water erosion, and the very slow to moderate permeability. Hillside seepage and shale outcrops are also serious limitations in many areas. Water runoff is rapid to very rapid during periods of heavy rainfall. The soils seldom have a reserve supply of moisture. Erosion has removed all or most of the original surface layer in many areas, causing very poor tilth and very low organic-matter content.

The soils in this unit are unsuitable for cultivation and are poorly suited to pasture. Most areas are in woodland, some areas are in pasture, and a few moderately steep areas are cultivated. Generally, the soils are too steep for machinery to be used for liming, fertilizing, seeding, or mowing. Excessive grazing on pasture destroys the protective cover and results in excessive erosion.

CAPABILITY UNIT VIIs–1

This unit consists of moderately steep to very steep, well-drained soils of the Oakville and Seaton series. These soils are on terraces and uplands. The Oakville soil has a surface layer of loamy fine sand and a subsoil of fine sand, and the Seaton soil has a surface layer and subsoil of silt loam. Permeability is moderate to very rapid. Available water capacity is very high in the Seaton soil and low to very low in the Oakville soil. The organic-matter content is low.

The main limitations are the low available water capacity and the steepness of slope of both soils, and the fertility of the Oakville soil. Soil blowing and water erosion are severe hazards in bare areas.

The soils of this unit are unsuitable for cultivation and are very poorly suited to pasture. Most of the acreage is in permanent pasture or woodland. It is suited to these uses. Permanent vegetation is desirable.

Predicted Yields

Table 4 shows predicted yields of the principal crops grown in Rock Island County under a high level of management. These predictions are based on yields (for the period 1954 to 1963), on soil tests, and on the experience and records of farmers, agronomists, conservationists, and farm advisors (*12*). The predictions are adjusted to reflect the trend toward higher yields during the period 1963 to 1972. Average yields are expected to increase. A few farmers obtain yields as high as 200 bushels of corn per acre in some years, but yields this high are still uncommon.

Management was determined on the basis of farming techniques, crop varieties, and fertilizers commonly used in 1972. Differences in weather from year to year may cause annual yields to range 20 percent above or below those shown in the table. Hay and pasture yields are predicted for varieties of grasses and legumes adapted to the soil.

Under a high level of management, adequate drainage, flood control, and erosion control are provided; the proper number of plants is grown; high quality seed is used; tillage is kept to a minimum and is done when soil moisture is favorable; weeds, plant diseases, and harmful insects are controlled; favorable soil reaction and near optimum levels of nitrogen, phosphorus, and potassium are maintained; efficient use is made of available crop residue, barnyard manure, and green manure crops; crops are harvested with the smallest possible loss; the combination of practices used is efficient; and all operations are timely.

Woodland[5]

About 45 percent of Rock Island County was in forest when pioneer settlement began. Since then most of the forest has been cleared. According to the Illinois Soil and Water Conservation Needs Inventory published in 1970, Rock Island County had 29,500 acres of forest in 1967. That acreage made up about 11 percent of the land area.

Because most trees were cleared from soils suitable for crops, the remaining trees are mainly on soils that are unsuitable for cultivation. These soils are either steep, wet, or inaccessible. The largest continuous forests are on Mixed alluvial land in the Mississippi River Valley, and in the steep Fayette, Hickory, High Gap, Seaton, and Sylvan soils that border the creek valleys and the Mississippi and Rock River Valleys.

The main tree species on the bottom lands are cottonwood, sycamore, pin oak, and yellow-poplar. The main species on the uplands are white oak, red oak, black oak, and hickory.

In table 5 the soils of Rock Island County are placed in 15 woodland suitability groups (*6*). Each group consists of soils capable of producing similar kinds of wood crops, that need similar management to produce these crops when the vegetation is similar, and that have about the same potential productivity. Borrow pit, Cut and fill land, Gravel pit, Quarry, and Marsh are not listed in a woodland suitability group.

[5] By WILLIAM CLARK, woodland conservationist, Soil Conservation Service.

Each woodland group is identified by a symbol, for example 2o1. The first element of the symbol is a number that indicates productivity by site class. The site class is based on the site quality, or site index, of one or more of the indicator tree species. Class 1 soils have the highest potential productivity.

The second element in the symbol is a letter that indicates the suitability subclass. It is based on important soil or physiographic characteristics. The letter *w* denotes excessive water, *s* denotes sandy texture and low available water capacity, *r* denotes steep slope, and *o* denotes no significant limitations or restrictions for woodland use.

The third element of the symbol is a numeral that designates specified soils, within a subclass, that require similar management and that have about the same potential productivity. The numeral 1 indicates upland and terrace soils for which all limitations to management are rated *slight;* 2 indicates upland and terrace soils for which one or more limitations are rated *moderate;* 3 indicates upland and terrace soils for which one or more limitations are rated *severe;* 4 indicates bottom-land soils for which all management limitations are rated *slight;* 5 indicates bottom-land soils for which one or more limitations are rated *moderate;* and 6 indicates bottom-land soils for which one or more limitations are rated *severe.* Plant competition is not considered in any of these ratings.

The potential productivity of a soil for a given species is commonly expressed as a site index. It is the height, in feet, that the dominant trees of a given species, growing on a specified soil, will reach at a specified age. The site index for cottonwood is based on height at 30 years of age (*6*), and for other species on height at 50 years of age.

The estimated average annual growth per acre is given in board feet measured by the Doyle Rule. The estimates are based on data from well-stocked, well-managed stands of upland oaks, pin oak, yellow-poplar, and cottonwood (*7, 8*). Red oak and white oak were used to estimate the rate of growth for all upland oaks.

The five limitations that affect the growth or management of trees are rated in table 5. The ratings are slight, moderate, or severe[6] for the soils in each group.

Erosion hazard refers to the risk of erosion in properly managed stands. The length and steepness of slopes, soil texture, and permeability are among the factors considered. *Slight* means that erosion is not a major problem. *Moderate* indicates that management is needed to prevent erosion during harvesting operations and in cleared areas. *Severe* indicates that intensive management is required to control erosion.

Equipment limitation refers to soil characteristics and topographic features that restrict the use of equipment in planting, tending, or harvesting trees. *Slight* means that there is little or no restriction on the type of equipment or time of year that it can be used. *Moderate* means that use of equipment is restricted by steep slopes or because soils are wet for 3 months or less each year. *Severe* indicates that very steep slopes make special harvesting methods necessary, or that use of equipment is restricted because the soils are wet for more than 3 months each year.

Seedling mortality refers to the expected loss of natural or planted tree seedlings as influenced by kinds of soil or topographic features. Losses caused by plant competition are excluded. It is assumed that the natural supply of seed is adequate, stock is good, seedlings are properly planted and cared for, and climatic conditions are normal. *Slight* means that losses normally are not more than 25 percent of the planted or natural stock; *moderate* indicates that losses are between 25 and 50 percent; and *severe* indicates that more than half of the planted or natural stock is likely to die.

Plant competition refers to the rate at which unwanted trees, shrubs, and weeds are likely to invade a given site where openings are made in the canopy. *Slight* means that competition is not a major problem. *Moderate* means that plant competition develops but does not prevent the establishment of desirable species, and it can be controlled easily. *Severe* indicates that stands of desired species are not restocked naturally, and planted trees may be choked out unless intensive management is applied to eliminate competing plants.

Windthrow hazard is an evaluation of soil characteristics that control tree root development and, therefore, affect tree windfirmness. All soils are rated *slight,* which indicates no special problems are recognized.

Table 5 lists, for each woodland suitability group, tree species to favor in existing stands. The ratings are based on the suitability of the species for the site and the market value of the trees. Species are not listed in order of preference and those suitable for planting are given for each group. On those soils where aspect is a factor, adapted species are listed for north-east and south-west exposures. On soils where windbreaks are considered beneficial some adapted tree and shrub species are also listed.

Wildlife[6]

Wildlife in Rock Island County can be classified into three major groups: openland, woodland, and wetland. The soils in this county have potential for habitat development for all three kinds of wildlife.

In table 6, the soils are placed in seven groups and are rated according to their suitability for elements of wildlife habitat and for kinds of wildlife (*14*). The ratings are good, fair, poor, and very poor. A rating of *good* means that habitats are easily established, improved, or maintained. A rating of *fair* indicates that the soils have moderate limitations for establishing and maintaining habitats. A *poor* rating means that the soils have severe limitations for establishing and maintaining habitats, and management may be difficult and expensive. A *very poor* rating means it is generally impractical to establish and maintain wildlife habitat on these soils. Borrow pit, Cut and fill land, Gravel pit, and Quarry are not placed in a wildlife group.

---

[6] By REX HAMILTON, biologist, Soil Conservation Service.

TABLE 4.—*Predicted average yields per acre of principal crops*

[Figures represent yields to be expected under a high level of management. Absence of a yield figure indicates that the soil is not well suited to the crop or that the crop is not commonly grown. Only arable soils are listed]

Soil	Corn	Soybeans	Oats	Alfalfa-grass[1]:		Red clover and grass[1]		Fescue[1]		Kentucky bluegrass pasture
	Bu	*Bu*	*Bu*	*Tons*	*AUD*[2]	*Tons*	*AUD*[2]	*Tons*	*AUD*[2]	*AUD*[2]
Atterberry silt loam	130	45	80	5.0	250	4.0	200	3.0	150	150
Burkhardt-Saude complex, 0 to 4 percent slopes (Burkhardt soil only)	65	22	45	2.5	125	1.5	75	1.0	50	75
Calco silty clay loam	110	42	70	4.5	225	3.5	175	3.0	150	100
Calco silty clay loam, wet	-----	-----	----	-----	-----	-----	-----	-----	-----	75
Canisteo silt loam	115	40	70	4.8	240	3.0	150	2.5	125	125
Coffeen silt loam	135	48	80	5.5	275	4.5	225	3.5	175	150
Coyne fine sandy loam, 0 to 4 percent slopes	80	28	60	3.2	160	2.5	125	2.0	100	100
Coyne fine sandy loam, 4 to 12 percent slopes	70	25	55	2.8	140	2.5	125	2.0	100	75
Denny silt loam	105	38	65	3.8	190	2.5	125	2.0	100	50
Dickinson sandy loam, 0 to 4 percent slopes	80	28	60	3.2	160	2.0	100	2.0	100	50
Dickinson sandy loam, 4 to 12 percent slopes	70	25	55	2.8	140	1.5	75	2.0	100	25
Dorchester silt loam	115	40	70	4.8	240	3.0	150	2.5	125	125
Downs silt loam, 0 to 2 percent slopes	125	45	75	5.2	260	3.5	175	3.0	150	150
Downs silt loam, 2 to 6 percent slopes	120	42	70	5.0	250	3.5	175	3.0	150	150
Elkhart silt loam, 7 to 12 percent slopes, eroded	100	35	60	4.5	225	3.5	175	2.5	125	100
Elkhart silt loam, 12 to 18 percent slopes, eroded	90	32	55	4.2	210	3.0	150	2.0	100	75
Fayette silt loam, 2 to 6 percent slopes	115	40	65	5.0	250	4.0	200	3.0	150	125
Fayette silt loam, 4 to 7 percent slopes, eroded	110	38	65	4.8	240	3.5	175	2.5	125	100
Fayette silt loam, 7 to 12 percent slopes, eroded	100	35	60	4.5	225	3.5	175	2.5	125	100
Fayette soils, 7 to 12 percent slopes, severely eroded	95	-----	55	4.2	210	3.0	150	2.0	100	75
Hickory silt loam, 12 to 18 percent slopes, eroded	80	-----	50	3.5	175	2.5	125	1.5	75	50
Hickory silt loam, 18 to 30 percent slopes	-----	-----	----	3.5	175	2.5	125	1.5	75	50
Hickory soils, 12 to 18 percent slopes, severely eroded	-----	-----	----	3.5	175	2.5	125	1.5	75	50
Hickory-Atlas complex, 12 to 18 percent slopes, severely eroded (Atlas soil only)	-----	-----	----	1.8	90	1.5	75	2.0	100	75
Hickory-High Gap silt loams, 12 to 18 percent slopes, eroded (High Gap soil only)	-----	-----	----	3.2	160	2.0	100	1.0	50	25
Hickory-High Gap silt loams, 18 to 30 percent slopes (High Gap soil only)	-----	-----	----	3.2	160	2.0	100	1.0	50	25
Hickory-Sylvan-Fayette silt loams, 12 to 18 percent slopes, eroded (Sylvan soil only)	75	-----	45	3.2	160	2.0	100	1.5	75	50
Hickory-Sylvan-Fayette complex, 12 to 18 percent slopes, severely eroded	-----	-----	----	3.0	150	2.0	100	1.0	50	50
Hickory-Sylvan-Fayette silt loams, 18 to 30 percent slopes	75	-----	45	3.2	160	2.0	100	1.5	75	50
Hickory-Sylvan complex, 18 to 30 percent slopes, severely eroded	-----	-----	----	3.0	150	2.0	100	1.0	50	50
Hitt loam, shallow variant, 0 to 4 percent slopes	80	28	55	3.2	160	2.0	100	1.5	75	75
Hoopeston sandy loam	90	32	60	3.8	190	2.5	125	2.0	100	50
Joslin silt loam, 0 to 2 percent slopes	120	42	70	5.2	260	4.0	200	3.0	150	125
Joslin silt loam, 2 to 6 percent slopes	115	40	65	5.0	250	4.0	200	3.0	150	125
Joy silt loam	140	48	85	5.8	290	4.5	225	3.5	175	125
Lamont, Tell, and Bloomfield soils, 4 to 12 percent slopes, eroded (Lamont soil only)	60	22	40	2.5	125	1.5	75	1.5	75	25
Lamont, Tell, and Bloomfield soils, 12 to 30 percent slopes, eroded (Lamont soil only)	55	-----	35	2.2	110	1.0	50	1.0	50	10
Landes loamy fine sand	80	28	55	3.2	160	2.0	100	1.5	75	25
Lawler loam	100	35	55	4.5	225	3.5	175	2.5	125	100
Lawson silt loam	130	45	80	5.5	275	4.5	225	3.0	150	125
Martinsville silt loam, 2 to 7 percent slopes	105	35	60	4.8	240	3.5	175	3.5	175	150
Martinsville soils, 7 to 12 percent slopes, severely eroded	90	-----	50	4.0	200	3.0	150	3.0	150	125
Martinsville soils, 12 to 18 percent slopes, severely eroded	-----	-----	----	3.8	190	3.0	150	3.0	150	125
Millington silt loam	115	40	70	4.2	210	3.0	175	2.0	100	75
Millington silt loam, wet	-----	-----	----	-----	-----	-----	-----	-----	-----	50
Millsdale silty clay loam	100	35	60	4.2	220	3.0	150	2.0	100	75
Montgomery silty clay loam	100	35	60	3.8	190	2.5	125	2.0	100	50
Muscatine silt loam	140	48	85	5.8	290	4.5	225	3.5	175	125
Niota silt loam	75	25	55	3.0	150	2.0	100	1.0	50	25
Oakville fine sand, 2 to 12 percent slopes	50	18	40	2.0	100	1.0	50	-----	-----	----------
Oakville fine sand, 12 to 60 percent slopes	-----	-----	----	1.8	90	.5	25	-----	-----	----------

See footnotes at end of table.

TABLE 4.—*Predicted average yields per acre of principal crops—Continued*

Soil	Corn	Soybeans	Oats	Alfalfa-grass[1]:		Red clover and grass[1]		Fescue[1]		Kentucky bluegrass pasture
Orion silt loam	115	40	70	4.8	240	3.5	175	3.0	150	100
Otter silt loam	110	38	65	4.8	240	3.5	175	3.0	150	75
Otter silt loam, wet	-----	-----	----	-----	-----	-----	-----	-----	-----	50
Port Byron silt loam, 0 to 2 percent slopes	125	45	75	5.2	260	4.0	200	3.0	150	125
Port Byron silt loam, 2 to 6 percent slopes	120	42	70	5.0	250	4.0	200	3.0	150	125
Raddle silt loam, 0 to 2 percent slopes	130	45	80	5.5	275	4.0	200	3.0	150	125
Raddle silt loam, 2 to 6 percent slopes	125	45	75	5.2	260	4.0	200	3.0	150	125
Radford silt loam	120	42	70	5.2	260	4.0	200	3.0	150	125
Rozetta silt loam	120	42	70	5.2	260	4.0	200	3.0	150	125
Sable silty clay loam	130	45	80	5.2	260	4.0	200	3.0	150	100
Saude loam	90	32	60	3.8	190	3.0	150	3.0	150	125
Sawmill silty clay loam	120	42	70	4.8	240	3.5	175	3.0	150	75
Sawmill silty clay loam, wet	-----	-----	----	-----	-----	-----	-----	-----	-----	50
Seaton silt loam, 2 to 6 percent slopes	105	35	60	4.8	240	3.5	175	2.5	125	100
Seaton silt loam, sandy substratum, 2 to 6 percent slopes	105	35	60	4.8	240	3.5	175	2.5	125	100
Seaton silt loam, 4 to 7 percent slopes, eroded	100	35	60	4.5	225	3.5	175	2.5	125	100
Seaton silt loam, 7 to 12 percent slopes, eroded	95	32	55	4.2	210	3.0	150	2.0	100	75
Seaton silt loam, 12 to 18 percent slopes, eroded	90	-----	50	4.0	200	3.0	150	2.0	100	75
Seaton-Oakville complex, 7 to 12 percent slopes, eroded (Oakville soil only)	50	18	40	2.0	100	1.0	50	-----	-----	----------
Seaton-Oakville complex, 12 to 18 percent slopes, eroded (Oakville soil only)	-----	-----	35	1.8	90	.5	25	-----	-----	----------
Seaton-Oakville complex, 18 to 30 percent slopes, eroded (Oakville soil only)	-----	-----	35	1.8	90	.5	25	-----	-----	----------
Seaton-Timula silt loams, 7 to 12 percent slopes, eroded (Timula soil only)	75	28	45	3.2	160	3.0	150	2.0	100	75
Seaton-Timula silt loams, 12 to 18 percent slopes, eroded (Timula soil only)	70	-----	40	3.0	150	2.0	100	1.0	50	50
Seaton-Timula silt loams, 18 to 30 percent slopes, eroded (Timula soil only)	65	-----	40	2.8	140	1.5	75	1.0	50	25
Sparta sand, 0 to 6 percent slopes	70	25	55	2.8	140	1.5	75	1.5	75	25
Stronghurst silt loam	120	42	70	5.2	260	4.0	200	3.0	150	125
Sylvan silt loam, 12 to 18 percent slopes	80	28	45	3.5	175	2.5	125	2.0	100	75
Sylvan silt loam, 18 to 30 percent slopes	80	-----	45	3.5	175	2.5	125	1.5	75	75
Sylvan soils, 7 to 12 percent slopes, severely eroded	75	-----	45	3.2	160	2.0	100	1.5	75	50
Sylvan soils, 12 to 18 percent slopes, severely eroded	-----	-----	----	3.0	150	2.0	100	1.0	50	50
Sylvan-Bold silt loams, 18 to 60 percent slopes (Bold soil only)	-----	-----	----	3.0	150	3.0	150	2.0	100	75
Tama silt loam, 0 to 2 percent slopes	135	48	80	5.5	275	4.0	200	3.5	175	150
Tama silt loam, 2 to 6 percent slopes	130	45	75	5.2	260	4.0	200	3.5	175	150
Tama silt loam, 4 to 7 percent slopes, eroded	120	42	70	5.0	250	3.5	175	3.0	150	125
Tama silt loam, 7 to 12 percent slopes, eroded	115	40	70	4.8	240	3.5	175	3.0	150	125
Trempealeau silt loam, 0 to 4 percent slopes	90	32	60	3.8	190	2.5	125	2.0	100	75
Velma silt loam, 12 to 18 percent slopes	90	32	55	4.0	200	3.0	150	3.0	150	125
Velma-Coatsburg silt loams, 12 to 18 percent slopes, eroded (Coatsburg soil only)	-----	-----	----	2.0	100	1.0	50	1.0	50	50
Wabash silty clay	90	32	60	3.2	160	2.0	100	2.5	125	100
Waukee loam, 0 to 4 percent slopes	90	32	60	3.8	190	2.5	125	2.0	100	75

[1] Hay and pasture yields are estimated for mixed stands of adapted grasses and legumes.

[2] Animal-unit-days is a term used to express the carrying capacity of pasture. It is the number of days one acre can carry one animal unit during a single grazing season without injury to the sod. One animal unit is defined as one cow, two yearling calves, one horse, five sheep, or four brood sows. For example, 20 sheep can graze about 25 days in a pasture that has a capacity of 100 animal-unit-days.

TABLE 5.—*Woodland groups, wood*

Woodland suitability groups	Potential productivity			Erosion hazard	Equipment limitation	Seedling mortality	Plant competition
	Species	Site index	Annual growth per acre[1]				
			Board feet				
Group 1o1: Well drained and moderately well drained soils that have slopes of 0 to 12 percent and are on uplands and terraces. They have a silt loam or loam surface layer and a silt loam or silty clay loam subsoil. They are moderately permeable and have high to very high available water capacity. Elkhart: 567D2. Port Byron: 277A, 277B. Raddle: 430A, 430B. Tama: 36A, 36B, 36C2, 36D2. No natural woodland on these soils.							
Group 1r2: Well drained and moderately well drained soils that have slopes of 12 to 30 percent and are on uplands and terraces. They have a silt loam or loam surface layer and a clay loam or silty clay loam subsoil. They are moderately permeable and have high to moderate available water capacity. Hickory: 8E2, 8E3, 8F, 8F3. Hickory-Sylvan-Fayette: 960E2, 960E3, 960F. Hickory-Sylvan: 960F3. Martinsville: 570E3. Velma: 250E. No natural woodland on Velma soil.	Upland oaks.[2]	85–95	350–450	Moderate	Moderate	Slight	Moderate
Group 2o1: Well-drained to somewhat poorly drained soils that have slopes of 0 to 12 percent and are on uplands and terraces. They have a silt loam or loam surface layer and a loam, silt loam, silty clay loam, clay loam, or silty clay subsoil. Permeability is moderate to moderately rapid in the Trempealeau soil and moderate to moderately slow in the rest. Available water capacity is moderate to very high. Downs: 386A, 386B. Fayette: 280B, 280C2, 280D2, 280D3. Joslin: 763A, 763B. Joy: 275. Martinsville: 570B, 570D3. Muscatine: 41. Rozetta: 279. Seaton: 274B, 274C2, 274D2. Seaton, sandy substratum: 563B. Sylvan: 19D3. Trempealeau: 765A. Waukee: 727A. No natural woodland on Downs, Joslin, Joy, Muscatine, Trempealeau, and Waukee soils.	Upland oaks.[2]	75–85	250–350	Slight	Slight	Slight	Slight to severe.

See footnotes at end of table.

crops, and soil-related limitations

Windthrow hazard	Species to be favored in existing stands	Species suitable for planting—					
		Cool sites on north- and east-facing slopes if erosion is—		Hot sites on south- and west-facing slopes if erosion is—		In windbreaks	
		None to moderate	Severe	None to moderate	Severe	Trees	Shrubs
----------	----------	White oak, black walnut, red oak, ash, white pine, red pine, sugar maple.	----------	Red pine, Scotch pine, black locust.	----------	White pine, red pine, Norway spruce, white spruce, Douglas-fir.	Forsythia, silky dogwood, autumn-olive, Amur maple, gray dogwood, Russian-olive, Amur honeysuckle, spirea, American cranberry bush, lilac.
Slight ------	White oak, red oak, yellow-poplar, ash.	White oak, black walnut, red oak, ash, white pine, red pine, sugar maple.	Red pine, Scotch pine, black locust.	Red pine, Scotch pine, black locust.	Red pine, Scotch pine, redcedar, black locust.	White pine, red pine, Norway spruce, white spruce, Douglas-fir.	Forsythia, silky dogwood, autumn-olive, Amur maple, gray dogwood, Russian-olive, Amur honeysuckle, spirea, American cranberry bush, lilac.
Slight ------	White oak, red oak, black walnut.	White oak, black walnut, red oak, ash, white pine, red pine, sugar maple.	Red pine, Scotch pine, black locust.	Red pine, white pine, black locust, Scotch pine.	Red pine, Scotch pine, redcedar, black locust.	White pine, red pine, Norway spruce, Douglas-fir.	Forsythia, silky dogwood, autumn-olive, Amur maple, gray dogwood, Russian-olive, Amur honeysuckle, spirea, American cranberry bush, lilac.

TABLE 5.—*Woodland groups, wood crops,*

Woodland suitability groups	Potential productivity			Erosion hazard	Equipment limitation	Seedling mortality	Plant competition
	Species	Site index	Annual growth per acre[1]				
Group 2o4: Dominantly soils are somewhat poorly drained, have slopes of 0 to 2 percent, and are on bottom land. They have a silt loam surface layer, and a silt loam substratum. They are dominantly moderately permeable and have moderate to very high available water capacity. All are subject to flooding. The Dorchester and Landes soils are better drained than other soils in this group; and the Landes soil has a sandier surface layer and substratum, is more rapidly permeable, and has a lower water-holding capacity. Coffeen: 428. Dorchester: 239. Landes: 304. Lawson: 451. Mixed alluvial land: 455. Orion: 415. Radford: 74.	Cottonwood Pin oak	95–105 85–95	450–550 350–450	Slight	Slight	Slight	Severe
Group 2r2: Well drained and moderately well drained soils that have slopes of 12 to 60 percent and are on uplands and terraces. They have a silt loam or silty clay loam surface layer and a silt loam, silty clay loam, or silty clay subsoil. They are moderately permeable to slowly permeable and have high to very high available water capacity. Clayey terrace escarpments: 577. Elkhart: 567E2. Seaton: 274E2. Sylvan: 19E, 19E3, 19F, 19F3. Sylvan-Bold: 962F. No natural woodland on Elkhart soils.	Upland oaks.[2]	75–85	250–350	Moderate to severe.	Moderate	Slight to moderate.	Moderate
Group 2w3: Poorly drained soils that have slopes of less than 2 percent and are on uplands and terraces. They have a silt loam or silty clay loam surface layer and a silt loam, silty clay, or silty clay loam subsoil. They are slowly permeable to moderately permeable and have moderate to very high available water capacity. Bedrock is at a depth of less than 5 feet in the Millsdale soils. Canisteo: 347. Millsdale: 317. Sable: 68. No natural woodland on these soils.							

See footnotes at end of table.

and soil-related limitations—Continued

Windthrow hazard	Species to be favored in existing stands	Species suitable for planting—					
		Cool sites on north- and east-facing slopes if erosion is—		Hot sites on south- and west-facing slopes if erosion is—		In windbreaks	
		None to moderate	Severe	None to moderate	Severe	Trees	Shrubs
Slight	Cottonwood, sycamore, yellow-poplar, pin oak.	Cottonwood, pin oak, sycamore, red maple, swamp white oak, ash.				White pine, red pine, Norway spruce, white spruce, Douglas-fir, arborvitae.	Silky dogwood, Amur maple, American cranberry bush, forsythia.
Slight	White oak, red oak, black walnut.	White oak, black walnut, red oak, ash, white pine, red pine, sugar maple.	Red pine, Scotch pine, black locust.	Red pine, ash, Scotch pine, black locust, redcedar.	Red pine, Scotch pine, redcedar.	White pine, red pine, Norway spruce, white spruce, Douglas-fir.	Forsythia, silky dogwood, autumn-olive, Amur maple, gray dogwood, Russian-olive, Amur honeysuckle, spirea, American cranberry bush, lilac.
		Cottonwood, pin oak, sycamore, red maple, swamp white oak, ash.				Arborvitae	Silky dogwood, Amur maple, American cranberry bush, forsythia.

TABLE 5.—*Woodland groups, wood crops,*

Woodland suitability groups	Potential productivity			Erosion hazard	Equipment limitation	Seedling mortality	Plant competition
	Species	Site index	Annual growth per acre[1]				
Group 2w5: Poorly drained soils that have slopes of less than 2 percent and are on bottom lands. The surface layer and substratum are loam, silt loam, or silty clay loam. These soils are moderately permeable to moderately slowly permeable and have high available water capacity. They are subject to flooding. Calco: 400, W400. Millington: 82, W82. Otter: 76, W76. Sawmill: 107, W107.	Pin oak Cottonwood	85–95 95–105	350–450 450–550	Slight	Moderate	Moderate	Severe
Group 2w6: Very poorly drained soils that have slopes of less than 2 percent and are on bottom lands. The surface layer is silty clay loam or silty clay, and the substratum is silty clay or clay. These soils are slowly permeable to very slowly permeable and have high available water capacity. Montgomery: 465. Wabash: 83. No natural woodland on these soils.							
Group 3o1: Somewhat poorly drained to well drained soils that have slopes of 0 to 12 percent and are on uplands and terraces. They have a silt loam, loam, or sandy loam surface layer and a silty clay loam, clay loam, silt loam, sandy clay loam, or sandy loam subsoil. They are moderately slowly permeable to moderately permeable, and have low to very high available water capacity. Atterberry: 61. Hitt variant: V506A. Hoopeston: 172. Lawler: 647. Seaton-Timula: 943D2. Stronghurst: 278. No natural woodland on the Atterberry, Hitt variant, Hoopeston, and Lawler soils.	Upland oaks.[2]	65–75	150–250	Slight	Slight	Slight	Slight

See footnotes at end of table.

and soil-related limitations—Continued

Windthrow hazard	Species to be favored in existing stands	Species suitable for planting—					
		Cool sites on north- and east-facing slopes if erosion is—		Hot sites on south- and west-facing slopes if erosion is—		In windbreaks	
		None to moderate	Severe	None to moderate	Severe	Trees	Shrubs
Slight	Pin oak, cottonwood, sycamore.	Cottonwood, pin oak, sycamore, red maple, swamp white oak, ash.	----------	----------	----------	Arborvitae	Silky dogwood, Amur maple, American cranberry bush, forsythia.
----------	----------	Cottonwood, pin oak, sycamore, red maple, swamp white oak, ash.	----------	----------	----------	Arborvitae	Silky dogwood, Amur maple, American cranberry bush, forsythia.
Slight	White oak, red oak, ash, bur oak.	White pine, Scotch pine, redcedar, pine.	White pine, Scotch pine, redcedar, black locust, red pine.	White pine, red pine.	Scotch pine, black locust, jack pine, red pine, redcedar, osage-orange.	White pine, Norway spruce, Douglas-fir, red pine, arborvitae, white spruce.	Silky dogwood, gray dogwood, autumn-olive, Amur maple, Russian-olive, spirea.

TABLE 5.—*Woodland groups, wood crops,*

Woodland suitability groups	Potential productivity			Erosion hazard	Equipment limitation	Seedling mortality	Plant competition
	Species	Site index	Annual growth per acre[1]				
Group 3r2: Dominantly somewhat poorly drained to well drained soils that have slopes of 12 to 30 percent and are on uplands. They have a silt loam surface layer and a silt loam, silty clay, or silty clay loam subsoil. They are very slowly permeable to moderately permeable, and have moderate to high available water capacity. Coatsburg soils are poorly drained. Hickory-Atlas: 946E3, 946F3. Hickory-High Gap: 945E2, 945F. Seaton-Timula: 943E2, 943F2. Velma-Coatsburg: 944E2. No natural woodland on the Velma-Coatsburg soils.	Upland oaks.[2]	65–75	150–250	Moderate	Moderate	Moderate	Slight
Group 3r3: Well drained and moderately well drained soils that have slopes of 18 to 60 percent and are on uplands. They have a loamy fine sand, loam, or silt loam surface layer and a fine silty clay loam subsoil. They are sand, silt loam, clay loam, or moderately permeable to very rapidly permeable and have very low to high available water capacity. Hickory-High Gap: 945G. Hickory-Sylvan: 960G. Oakville: 741F. Seaton-Oakville: 942F2. Strawn-Chute: 959G.	Upland oaks.[2]	65–75	150–250	Severe	Severe	Severe	Slight
Group 3s2: Well-drained to somewhat excessively drained soils that have slopes of 0 to 12 percent and are on uplands and terraces. They have a sandy loam, fine sandy loam, silt loam, or loam surface layer and a sandy loam, fine sandy loam, loam, or silty clay loam subsoil. They are moderately permeable to rapidly permeable, and have low to moderate available water capacity. Soil blowing is a hazard. Burkhart-Saude: 961A. Coyne: 764A, 764C. Dickinson: 87A, 87C. Lamont, Tell, Bloomfield: 947C2. Saude: 774. No natural woodland on the Burkhart-Saude, Dickinson, and Saude soils.	Upland oaks.[2]	65–75	150–250	Slight to moderate.	Slight to severe.	Moderate to severe.	Slight to severe.

See footnotes at end of table.

and soil-related limitations—Continued

Windthrow hazard	Species to be favored in existing stands	Species suitable for planting—					
		Cool sites on north- and east-facing slopes if erosion is—		Hot sites on south- and west-facing slopes if erosion is—		In windbreaks	
		None to moderate	Severe	None to moderate	Severe	Trees	Shrubs
Slight	White oak, red oak, white ash, bur oak.	White pine, Scotch pine, redcedar, pine.	White pine, Scotch pine, redcedar, black locust, red pine.	White pine, red pine.	Scotch pine, black locust, jack pine, red pine, redcedar, osage-orange.	White pine, Norway spruce, Douglas-fir, red pine, arborvitae, white spruce.	Silky dogwood, gray dogwood, autumn-olive, Amur maple, Russian-olive, spirea.
Slight	Red oak, white oak, bur oak, white ash.	Redcedar, white pine, red pine, Scotch pine.	White pine, Scotch pine, redcedar, black locust, red pine.	White pine, red pine.	Scotch pine, black locust, jack pine, red pine, redcedar, osage-orange.	White pine, red pine, Norway spruce, Douglas-fir, arborvitae, white spruce.	Russian-olive, autumn-olive, silky dogwood, gray dogwood, autumn-olive, Amur maple, Russian-olive, spirea.
Slight	Black oak, white oak.	White pine, Scotch pine, redcedar, red pine.	White pine, Scotch pine, redcedar, black locust, red pine.	White pine, red pine.	Scotch pine, black locust, jack pine, red pine, redcedar, osage-orange.	White pine, Norway spruce, Douglas-fir, red pine, arborvitae, white spruce.	Silky dogwood, gray dogwood, autumn-olive, Amur maple, Russian-olive, spirea.

TABLE 5.—*Woodland groups, wood crops,*

Woodland suitability groups	Potential productivity			Erosion hazard	Equipment limitation	Seedling mortality	Plant competition
	Species	Site index	Annual growth per acre[1]				
Group 3s3: Well drained to excessively drained soils that have slopes of 12 to 30 percent and are on uplands and terraces. They have a gravelly sandy loam or fine sandy loam surface layer and a gravel, sand, or fine sandy loam subsoil or substratum. They are moderately rapidly permeable and have very low to moderate available water capacity. Soil blowing is a hazard. Gravelly terrace escarpments: G577. Lamont, Tell, Bloomfield: 947F2.	Upland oaks.[2]	65–75	150–250	Moderate	Moderate to severe.	Severe	Slight
Group 3w2: Poorly drained soils that have slopes of less than 2 percent and are on terraces and uplands. They have a silt loam surface layer and a silty clay loam or silty clay subsoil. They are slowly permeable and have moderate to high available water capacity. Denny: 45. Niota: 261. No natural woodland on the Denny soil.	Pin oak	75–85	200–300	Slight	Moderate	Moderate	Severe
Group 4s2: Well drained to excessively drained soils that have slopes of 0 to 18 percent and are on uplands and terraces. They have a sand or loamy fine sand surface layer and a sand, gravel, or fine sand subsoil. They are rapidly permeable to very rapidly permeable and have very low or low available water capacity. Soil blowing is a hazard. Blown-out land: 63. Oakville: 741C. Sparta: 88B. Seaton-Oakville: 942D2, 942E2. No natural woodland on the Sparta soil.	Upland oaks.[2]	55–65	100–150	Slight	Moderate	Moderate	Slight

[1] Doyle Rule (*2*).

[2] Upland oaks are white oak, red oak, black oak, and bur oak.

The six elements of wildlife habitat and the three kinds of wildlife shown in table 6 are defined in the following paragraphs.

Grain and seed crops are domestic grains or seed-producing annual plants such as corn, sorghum, wheat, oats, soybeans, buckwheat, and sunflower.

Grasses and legumes are domestic perennial grasses and legumes such as brome, fescue, timothy, redtop, orchardgrass, reed canarygrass, clovers, trefoil, alfalfa, and sericea.

Wild herbaceous plants are native or introduced perennial grasses and forbs that provide food and cover principally for upland wildlife. These plants include bluestem, indiangrass, wheatgrasses, wildrye, oatgrasses, pokeweed, strawberries, lespedeza, tick-clover, wild beans, jewelweed, and ragweed.

Hardwood plants are nonconiferous trees, shrubs, and woody vines that produce fruits, nuts, buds, catkins, twigs (browse), or foliage used extensively as food by wildlife. These plants are commonly established by natural processes but may also be planted. They include oak, cherry, hawthorn, dogwood, viburnum, hazel, maple, birch, ash, grapes, sumac, briers, greenbriers, and roses.

Wetland plants are annual and perennial wild herbaceous plants, excluding submerged or floating aquatic

and soil-related limitations—Continued

Windthrow hazard	Species to be favored in existing stands	Species suitable for planting—					
		Cool sites on north- and east-facing slopes if erosion is—		Hot sites on south- and west-facing slopes if erosion is—		In windbreaks	
		None to moderate	Severe	None to moderate	Severe	Trees	Shrubs
Slight	Black oak, white oak.	White pine, Scotch pine, redcedar, red pine.	White pine, Scotch pine, redcedar, black locust, red pine.	White pine, red pine.	Scotch pine, black locust, jack pine, red pine, redcedar, osage-orange.	White pine, Norway spruce, Douglas-fir, red pine, arborvitae, white spruce.	Silky dogwood, gray dogwood, autumn-olive, Amur maple, Russian-olive, spirea.
Slight	White oak, pin oak, ash, yellow poplar.	Pin oak, ash, red maple.	----------	----------	----------	Arborvitae	Forsythia, gray dogwood, Amur maple, American cranberry bush.
Slight	Black oak, white oak.	White pine, Scotch pine, redcedar, red pine.	White pine, Scotch pine, redcedar, black locust, red pine.	White pine, red pine.	Scotch pine, black locust, jack pine, red pine, redcedar, osage-orange.	White pine, Norway spruce, Douglas-fir, red pine, arborvitae, white spruce.	Silky dogwood, autumn-olive, Amur maple, Russian-olive, spirea.

plants, that grow on moist or wet sites. These plants, used mainly by wetland wildlife for food and cover, include smartweeds, wild millets, rushes, sedges, reeds, rice cutgrass, mannagrass, bluejoint, cordgrasses, cattails, pondweeds, wild celery, and spatterdocks.

Shallow water developments are impoundments or excavations generally not more than 5 feet deep. Examples are low dikes and levees, shallow dugouts, level ditches, and devices for controlling the water level on marshy streams or channels.

Soils are not rated for impounded farm ponds in table 6. However, this type of pond attracts migratory waterfowl and can be used for freshwater fish. Features affecting the use of soils for impounded farm ponds are given in a table in the engineering section.

Openland wildlife includes quail, mourning dove, meadowlark, cottontail rabbit, red fox, and other birds and mammals that normally live on cropland, pastures, hayland, and other areas overgrown with grasses, forbs, and shrubs. Wildlife habitat elements used to rate the soils for this kind of wildlife are grain and seed crops, grasses and legumes, wild herbaceous plants, and hardwood plants.

Woodland wildlife includes squirrel, white-tailed deer, raccoon, chipmunks, woodpeckers, nuthatches, and other birds and mammals that frequent wooded

areas consisting of hardwood trees and shrubs. Wildlife habitat elements used to rate the soils for this kind of wildlife are grasses and legumes, wild herbaceous plants, and hardwood plants.

Wetland wildlife includes various kinds of waterfowl, muskrat, mink, kingfisher, red-winged blackbird and other birds and mammals that normally live in wet areas such as ponds, marshes, and swamps. Wildlife habitat elements used to rate the soils for this kind of wildlife are wetland plants and shallow water developments.

Recreation

In table 7, the soils of Rock Island County are placed in eight recreation groups and are rated according to their limitations for recreational uses. The ratings are based on soil characteristics such as natural drainage, seasonal high water table, hazard of flooding, permeability, slope, texture of the surface layer, and stoniness or rockiness. Ratings are not given for Borrow pit, Cut and fill land, Gravel pit, or Quarry.

The ratings are slight, moderate, or severe. A rating of *slight* means that the soil has few if any limitations for the use specified or that the limitations can be easily overcome. A rating of *moderate* indicates that the limitations can be overcome by careful planning and maintenance. A rating of *severe* indicates that the soil is poorly suited to the use specified, or that the limitations can only be overcome by intensive engineering practices requiring a large investment. The soil properties that determine moderate and severe limitations are mentioned in table 7. The recreational uses given in the table are discussed in the following paragraphs.

TABLE 6.—*Suitability*

Wildlife groups	Elements of wildlife habitat		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants
Group 1: Well drained and moderately well drained, nearly level to strongly sloping soils on uplands and terraces. Coyne: 764A, 764C. Downs: 386A, 386B. Elkhart: 567D2. Fayette: 280B, 280C2, 280D2, 280D3. Hitt variant: V506A. Joslin: 763A, 763B. Martinsville: 570B, 570D3. Port Byron: 277A, 277B. Raddle: 430A, 430B. Rozetta: 279. Seaton: 274B, 274C2, 274D2. Seaton, sandy substratum: 563B. Seaton-Timula: 943D2. Sylvan: 19D3. Tama: 36A, 36B, 36C2, 36D2. Trempealeau: 765A. Waukee: 727A.	Good if slope is less than 7 percent, fair if 7 to 12 percent, poor if 7 to 12 percent and severely eroded.	Good on all slopes; fair if severely eroded.	Good
Group 2: Well drained and moderately well drained, moderately steep soils on uplands. Clayey terrace escarpments: 577. Elkhart: 567E2. Hickory: 8E2, 8E3. Hickory-Atlas:[1] 946E3. Hickory-High Gap: 945E2. Hickory-Sylvan-Fayette: 960E2, 960E3. Martinsville: 570E3. Seaton: 274E2. Seaton-Timula: 943E2. Sylvan: 19E, 19E3. Velma: 250E. Velma-Coatsburg:[2] 944E2.	Poor: slope severely limits use; very poor if severely eroded.	Fair: slope moderately limits use; poor if severely eroded.	Good
Group 3: Well drained and moderately well drained, steep and very steep soils on uplands. Hickory: 8F, 8F3. Hickory-Atlas: 946F3. Hickory-High Gap: 945F, 945G. Hickory-Sylvan-Fayette: 960F. Hickory-Sylvan: 960F3, 960G. Seaton-Timula: 943F2. Sylvan: 19F, 19F3. Sylvan-Bold: 962F.	Very poor: slope very severely limits use.	Fair if slope is less than 30 percent; very poor if more than 30 percent.	Good

See footnotes at end of table.

Cottages and utility buildings.—These are cottages, washrooms and bathrooms, picnic shelters, and service buildings that are used seasonally or all year. The ratings are based mainly on soil features that contribute to the adequate support of these buildings. Additional information on soil limitations for septic tank filter fields is given in the section "Engineering."

Campsites.—These are areas suitable for tents and trailers and for living outdoors for a period of 1 week or more. Little site preparation should be required. The soils are rated according to their limitations for unsurfaced parking areas for cars and camp trailers and for heavy traffic by people, horses, and small vehicles such as bicycles.

Picnic areas.—Soils used for picnic areas need to support intensive foot traffic. Features that affect the desirability of a site, such as trees or ponds, are not considered in the ratings.

Playgrounds.—These areas are developed for intensive play and for organized games such as baseball, football, and tennis. They are subject to intensive foot traffic.

Paths and trails.—Soils used for paths and trails need to support intensive foot traffic and horses. Little preparation should be needed. Paths and trails on sloping soils should be contoured to control erosion.

Golf fairways.—The soils are rated only according to their limitations for fairways. Greens, traps, and hazards generally are made from transported soil material. Soils used for fairways should support intensive foot traffic and golf carts. In addition, turf and various kinds of trees and shrubs should grow well on these soils.

of soils for wildlife

Elements of wildlife habitat—Continued			Kinds of wildlife		
Hardwood plants	Wetland plants	Shallow water developments	Openland wildlife	Woodland wildlife	Wetland wildlife
Good	Very poor: no suitable plants for food and cover.	Very poor: water table too deep.	Good on all slopes; fair if severely eroded.	Good on all slopes; fair if severely eroded.	Very poor: no suitable wetland food and cover plants; water supply limited.
Good	Very poor: no suitable plants for food and cover.	Very poor: sloping; water table too deep.	Fair: production of grain and seed crops severely limited; poor if slope is severely eroded.	Good: production of grasses and legumes moderately limited.	Very poor: no suitable wetland food and cover plants; water supply limited.
Good	Very poor: no suitable plants for food and cover.	Very poor: sloping; water table too deep.	Poor: unsuited to grain and seed crops.	Fair: production of grasses and legumes moderately limited.	Very poor: no suitable wetland food and cover plants; water supply limited.

TABLE 6.—*Suitability of soils*

Wildlife groups	Elements of wildlife habitat		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants
Group 4: Somewhat poorly drained, nearly level soils on uplands and terraces. Atterberry: 61. Hoopeston: 172. Joy: 275. Lawler: 647. Muscatine: 41. Stronghurst: 278.	Good for drained areas; fair for undrained areas; wetness hazard.	Good for drained areas; fair for undrained areas; wetness hazard.	Good
Group 5: Somewhat poorly drained, nearly level soils on bottom lands. Coffeen: 428. Dorchester: 239.[3] Landes: 304.[4] Lawson: 451. Mixed alluvial land: 455. Orion: 415. Radford: 74.	Fair for most soils: wetness and flooding hazard; good for Dorchester soils and all drained areas.	Fair for most soils: wetness and flooding hazard; good for Dorchester soils and all drained areas.	Good for most soils; fair for Landes soils.
Group 6: Poorly drained to very poorly drained, nearly level soils on uplands, terraces and bottom lands. Calco: 400, W400. Canisteo: 347. Denny: 45. Marsh: 718. Millington: 82, W82. Millsdale: 317. Montgomery: 465. Niota: 261. Otter: 76, W76. Sable: 68. Sawmill: 107, W107. Wabash: 83.	Good for drained areas; poor for undrained areas; wetness hazard, flooding, or ponding limits growth; very poor for all wet soils and Marsh.	Good for drained areas; poor for undrained areas; wetness hazard, flooding, or ponding limits growth.	Good for drained areas; fair for undrained areas; wetness hazard, flooding, or ponding limits growth; poor for all wet soils and Marsh.
Group 7: Well-drained to somewhat excessively drained, nearly level to very steep soils on uplands and terraces. Blown-out land: 63. Burkhardt-Saude: 961A. Dickinson: 87A, 87C. Gravelly terrace escarpments: G577. Lamont, Tell, and Bloomfield: 947C2, 947F2. Oakville: 741C, 741F. Saude: 774. Seaton-Oakville: 942D2, 942E2, 942F2. Sparta: 88B. Strawn-Chute: 959G.	Very poor for most soils: slope; low available water capacity; fair for Burkhardt-Saude, Dickinson, and Saude soils.	Poor for most soils: slope; low available water capacity; fair for Burkhardt-Saude, Dickinson, and Saude soils.	Poor for most soils: slope; low available water capacity; fair for Burkhardt-Saude, Dickinson, and Saude soils.

[1] Atlas soils are somewhat poorly drained.
[3] Coatsburg soils are poorly drained.
[3] Dorchester soils are well drained and moderately well drained.
[4] Landes soils are well drained.

for wildlife—Continued

Elements of wildlife habitat—Continued			Kinds of wildlife		
Hardwood plants	Wetland plants	Shallow water developments	Openland wildlife	Woodland wildlife	Wetland wildlife
Good	Fair: limited suitable plants for food and cover.	Fair: water table not high enough to maintain water level all year.	Good	Good	Fair: water supply and number of suitable wetland food and cover plants moderately limited.
Good	Fair for most soils: limited suitable plants for food and cover; poor for Dorchester soils; very poor for Landes soils.	Fair for most soils: water table not high enough to maintain water level all year; poor for Dorchester soils; very poor for Landes soils.	Good for most soils: production of grain and seed crops moderately limited in undrained areas; fair for Landes soils.	Good in drained areas; fair for Landes soils and undrained areas; growth of grasses and legumes moderately limited.	Fair for most soils: water supply and number of suitable wetland food and cover plants moderately limited; poor for Dorchester soils; very poor for Landes soils.
Good for drained areas; fair for undrained areas; poor for all wet soils; Marsh and bottom-land soils subject to flooding.	Poor for drained areas; limited suitable plants; good for undrained areas.	Fair for drained areas; water supply limited; good for undrained areas; bottom-land soils subject to flooding.	Good for drained areas; fair for undrained areas; grain and seed crops severely limited.	Good for drained areas; fair for undrained areas; growth of food and cover plants limited.	Poor for drained areas: number of suitable wetland food and cover plants severely limited; good for undrained areas.
Poor for most soils: slope; low available water capacity; fair for Burkhardt-Saude Dickinson, and Saude soils.	Very poor: low available water capacity; no suitable plants.	Very poor: too sloping; water table too deep.	Poor for most soils: low available water capacity severely limits growth of food and cover plants; very poor for Strawn-Chute soils; fair for Dickinson and Saude soils.	Poor for most soils: low available water capacity severely limits growth of food and cover plants; good for Dickinson and Saude soils.	Poor: no suitable wetland food and cover plants; water supply limited.

TABLE 7.—*Soils and*

Recreation group, soil series, and map symbols	Degree of limitation and soil features affecting use for—	
	Cottages and utility buildings	Campsites
Group 1: Well drained and moderately well drained, nearly level to moderately sloping soils on uplands and terraces. Coyne: 764A. Downs: 386A, 386B. Fayette: 280B, 280C2. Hitt variant: V506A. Joslin: 763A, 763B. Martinsville: 570B. Port Byron: 277A, 277B. Raddle: 430A, 430B. Rozetta: 279. Seaton: 274B, 274C2. Seaton sandy substratum: 563B. Tama: 36A, 36B, 36C2. Trempealeau: 765A. Waukee: 727A.	Slight for all but the Hitt shallow variant. Severe for Hitt soil: limestone bedrock at a depth of 20 to 40 inches.	Slight
Group 2: Somewhat excessively drained and well drained, nearly level and gently sloping soils on uplands and terraces. Blown-out land: 63. Burkhardt-Saude: 961A. Dickinson: 87A. Saude: 774. Sparta: 88B.	Slight for Burkhardt, Dickinson, and Saude soils. Moderate for Sparta soil. Severe for Blown-out land. All soils are droughty.	Slight for Burkhardt, Dickinson, and Saude soils. Moderate to severe for Blown-out land and Sparta soils: sandy surface layer; droughtiness; soil blowing; inherent low fertility; difficult to maintain plant cover.
Group 3: Somewhat excessively drained, well drained, and moderately well drained, moderately sloping and strongly sloping soils on uplands and terraces. Coyne: 764C. Dickinson: 87C. Elkhart: 567D2. Fayette: 280D2, 280D3. Lamont, Tell, and Bloomfield: 947C2. Martinsville: 570D3. Oakville: 741C. Seaton: 274D2. Seaton-Oakville: 942D2. Seaton-Timula: 943D2. Sylvan: 19D3. Tama: 36D2.	Slight if slope is less than 7 percent, moderate if 7 to 12 percent. Oakville and Bloomfield soils are subject to blowing, are droughty, and have inherent low fertility.	Slight for all but Oakville and Bloomfield soils if slope is less than 7 percent, moderate if 7 to 12 percent. Moderate for Oakville and Bloomfield soils if slope is 7 to 12 percent, severe if more than 12 percent. In addition, these soils have a sandy surface layer and inherent low fertility, are droughty, and are subject to blowing. Maintaining a plant cover is difficult.
Group 4: Somewhat excessively drained, well drained, and moderately well drained, moderately steep to very steep soils on uplands. Clayey terrace escarpments: 577. Elkhart: 567E2. Gravelly terrace escarpments: G577. Hickory: 8E2, 8E3, 8F, 8F3. Hickory-Atlas: 946E3, 946F3. Hickory-High Gap: 945E2, 945F, 945G. Hickory-Sylvan-Fayette: 960E2, 960E3, 960F. Hickory-Sylvan: 960F3, 960G. Lamont, Tell, and Bloomfield: 947F2. Martinsville: 570E3. Oakville: 741F. Seaton: 274E2. Seaton-Oakville: 942E2, 942F2. Seaton-Timula: 943E2, 943F2. Strawn-Chute: 959G. Sylvan: 19E, 19E3, 19F, 19F3. Sylvan-Bold: 962F. Velma: 250E. Velma-Coatsburg: 944E2.	Severe: slope	Severe: slope

recreational facilities

Degree of limitation and soil features affecting use for—Continued			
Picnic areas	Playgrounds	Paths and trails	Golf fairways
Slight for all but Coyne, Trempealeau, and Waukee soils. These soils are somewhat droughty.	Slight if slope is less than 12 percent, moderate if 2 to 7 percent. Moderate for Hitt shallow variant: limestone bedrock at a depth of 20 to 40 inches.	Slight	Slight.
Slight for Burkhardt, Dickinson, and Saude soils: droughtiness. Moderate to severe for Sparta soils and Blown-out land: soil blowing; sandy surface layer; droughtiness; inherent low fertility.	Slight for Burkhardt, Dickinson, and Saude soils: droughtiness. Severe for Blown-out land and Sparta soils: sandy surface layer; soil blowing; droughtiness; inherent low fertility; difficult to maintain plant cover.	Slight for Burkhardt, Dickinson, and Saude soils. Moderate to severe for Blown-out land and Sparta soils; sandy surface layer; droughtiness; soil blowing; inherent low fertility.	Slight for Dickinson soils. Moderate for Burkhardt and Saude soils: droughtiness. Severe for Blown-out land and Sparta soils: sandy surface layer; soil blowing; droughtiness; low inherent fertility; difficult to maintain plant cover. All soils are a source of sand for gravel.
Slight if slope is less than 7 percent, moderate if 7 to 12 percent. Oakville and Bloomfield soils have sandy surface layer and low inherent fertility, are droughty, and are subject to blowing. Maintaining a plant cover is difficult.	Moderate if slope is less than 7 percent, severe if 7 to 12 percent. Oakville and Bloomfield soils have sandy surface layer and low fertility, are droughty, and are subject to blowing.	Slight for all but Oakville and Bloomfield soils. Moderate for Oakville and Bloomfield soils; sandy surface layer; low inherent fertility; hazard of soil blowing.	Moderate for all but Oakville and Bloomfield soils. Severe for Oakville and Bloomfield soils: slope; inherent low fertility; droughty; difficult to maintain turf. Dickinson, Lamont, Bloomfield, and Oakville soils are a source of sand for greens.
Severe: slope	Severe: slope	Moderate if slope is less than 12 to 18 percent, severe if more than 18 percent.	Severe: slope. Lamont, Bloomfield, and Oakville soils are a source of sand for greens.

TABLE 7.—*Soils and recreational*

Recreation group, soil series, and map symbols	Degree of limitation and soil features affecting use for—	
	Cottages and utility buildings	Campsites
Group 5. Somewhat poorly drained, nearly level soils on uplands and terraces. Atterberry: 61. Hoopeston: 172. Joy: 275. Lawler: 647. Muscatine: 41. Stronghurst: 278.	Moderate: seasonal water table at a depth of 12 to 36 inches; high to moderate frost action potential.	Moderate: seasonal water table at a depth of 12 to 36 inches. Stronghurst soils dry more slowly than other soils in this group.
Group 6: Somewhat poorly drained to well-drained, nearly level soils on bottom land. Coffeen: 428. Dorchester: 239. Landes: 304. Lawson: 451. Mixed alluvial land: 455. Orion: 415. Radford: 74.	Severe: subject to flooding; seasonal high water table; high frost action potential.	Severe: subject to flooding; seasonal high water table. Landes soils have a sandy surface layer, are droughty, and are subject to soil blowing; difficult to maintain plant cover.
Group 7: Poorly drained and very poorly drained, nearly level soils on uplands and terraces. Canisteo: 347. Denny: 45. Millsdale: 317. Montgomery: 465. Niota: 261. Sable: 68.	Severe: less than 12 inches to seasonal water table; soils dry slowly; moderate to high frost action potential; high to moderate shrink-swell potential in the subsoil. Millsdale soils have limestone bedrock between depths of 20 and 40 inches.	Severe: less than 12 inches to seasonal water table; soils dry slowly; moderate to high frost action potential; drainage needed in most places; turf easily damaged when wet.
Group 8: Poorly drained and very poorly drained, nearly level soils on bottom land. Calco: 400, W400. Marsh: 718. Millington: 82, W82. Otter: 76, W76. Sawmill: 107, W107. Wabash: 83.	Severe: subject to flooding and ponding; less than 12 inches to seasonal water table; soils dry slowly; high to moderate frost action potential.	Severe: subject to flooding and ponding; less than 12 inches to seasonal water table; soils dry slowly; drainage needed in most places.

Engineering[7]

This section shows the principal properties of soils that affect engineering practices. With the soil map for identification, the information presented should help engineers estimate the suitability of the soils for engineering uses. It is not intended that information in this section eliminate the need for onsite sampling and testing for design and construction of specific engineering works.

Information in this section can be used to—

1. Make studies that will aid in planning and developing agricultural, industrial, business, residential, and recreational sites.
2. Make preliminary evaluations of the soils that will aid in selecting locations for flood control structures, agricultural drainage systems, farm ponds, irrigation systems, terraces, diversions, and waterways.
3. Make preliminary evaluations of soils and sites that will aid in selecting locations for highways and airports and in planning detailed investigations at selected locations.
4. Locate probable sources of road and highway construction materials.
5. Correlate performance of engineering structures with soil mapping units to obtain information that will be useful in designing and maintaining such structures.
6. Determine the suitability of soils for cross-country movement of vehicles and construction equipment.
7. Supplement information obtained from other published maps, reports, and aerial photographs for the purpose of making maps and reports that can be used readily by engineers.
8. Make preliminary estimates for other construction purposes pertinent to the particular area.

Much of the information in this section is given in tables 8, 9, 10, and 11, which show, respectively, several estimated soil properties significant in engineering, soil interpretations that are useful to engineers for

[7] HERBERT L. DAVENPORT, agricultural engineer, Soil Conservation Service, Sterling, Illinois, helped prepare this section.

facilities—Continued

Degree of limitation and soil features affecting use for—Continued			
Picnic areas	Playgrounds	Paths and trails	Golf fairways
Moderate: seasonal water table at a depth of 12 to 36 inches. Stronghurst soils dry more slowly than other soils in this group.	Moderate: seasonal water table at a depth of 12 to 36 inches. Stronghurst soils dry more slowly than other soils in this group.	Moderate: seasonal water table at a depth of 12 to 36 inches. Stronghurst soils dry more slowly than other soils in this group.	Moderate: seasonal water table at a depth of 12 to 36 inches. Stronghurst soils dry more slowly than other soils in this group.
Severe: subject to flooding; seasonal high water table. Landes soils dry faster than other soils in this group, but have a sandy surface layer, are droughty, and are subject to soil blowing; difficult to maintain plant cover.	Severe: subject to flooding; seasonal high water table. Landes soils dry faster than other soils in this group, but have a sandy surface layer, are droughty, and are subject to soil blowing; difficult to maintain plant cover.	Moderate: subject to flooding; seasonal high water table. Landes soils dry faster than other soils in this group, but have a sandy surface layer, are droughty, and are subject to soil blowing; difficult to maintain plant cover.	Severe: subject to flooding; seasonal high water table. Landes soils dry faster than other soils in this group, but have a sandy surface layer, are droughty, and are subject to soil blowing; difficult to maintain plant cover; source of sand for greens.
Severe: less than 12 inches to seasonal water table; soils dry slowly; drainage needed in most places; turf easily damaged when wet.	Severe: less than 12 inches to seasonal water table; soils dry slowly; drainage needed in most places.	Severe: less than 12 inches to seasonal water table; soils dry slowly; drainage needed in most places.	Severe: less than 12 inches to seasonal water table; soils dry slowly; drainage needed in most places; turf easily damaged when wet.
Severe: subject to flooding and ponding; less than 12 inches to seasonal water table; soils dry slowly; drainage needed in most places.	Severe: subject to flooding and ponding; less than 12 inches to seasonal water table; soils dry slowly; drainage needed in most places.	Severe: subject to flooding and ponding; less than 12 inches to seasonal water table; soils dry slowly; drainage needed in most places.	Severe: subject to flooding and ponding; less than 12 inches to seasonal water table; soils dry slowly; drainage needed in most places.

farm and nonfarm purposes, and test data for representative soil samples.

Engineering classification systems

Engineers commonly classify soils according to the Unified Soil Classification System (*11*) and the system adopted by the American Association of State Highway Officials (AASHO) (*1*).

The Unified system of soil classification is based on the identification of soils according to particle-size distribution, plasticity index, liquid limit, and organic-matter content. In this system, GW and GP are gravels that are well graded or poorly graded; SW and SP are sands that are well graded or poorly graded; SM and SC are sands that have nonplastic or plastic fines; GM and GC are gravelly soils that have nonplastic or plastic fines; ML and CL are nonplastic or plastic fine-grained materials that have low liquid limit; and MH and CH are mainly nonplastic or plastic fine-grained materials that have a high liquid limit.

The AASHO system is used to classify soils according to those properties that affect use in highway construction. Soils of about the same general load-carrying capacity and service are placed into seven basic groups, A–1 to A–7. Generally, the best soils for road subgrade are classified A–1, the next best A–2, and the poorest soils are A–7.

Estimated engineering properties

Table 8 gives the estimated soil properties significant in engineering. The information in this table is based on the test data in table 11 and other available data.

Depth to bedrock is not estimated in table 8, because most soils in the county are deep enough so that bedrock generally does not affect their use. However, depth to bedrock is less than 40 inches for the High Gap, Hitt shallow variant, and Millsdale soils.

Depth to seasonal high water table is the minimum depth at which the soil is periodically saturated or contains free water, unless drainage systems have been installed. It may be a perched water table or the upper limit of the apparent water table. The water table commonly interferes with timely and efficient use and management of the soil when it is near the surface. It generally rises late in winter and early in spring.

Permeability is the quality that enables a soil to

transmit water or air. The estimates in table 8 are in inches per hour and are based on the structure and porosity of the soil. Plowpans, surface crusts, and other properties resulting from use of the soil are not considered.

Available water capacity is the amount of water the soil can hold available for use by most plants. It essentially is the difference between the amount of water at field capacity and the amount at wilting point. It is commonly expressed in inches of water per inch of soil.

Reaction is the degree of acidity or alkalinity of a soil, expressed as a pH value. The pH indicates the corrosiveness of soil solution and the protection structures, such as pipelines, require when placed in the soil. Reaction is also used to estimate the suitability of certain plants for planting along highways and other areas where the soil has been disturbed. The pH value and related terms used to describe soil reaction are defined in the Glossary.

Shrink-swell potential indicates the volume change to be expected of a soil when the moisture content changes. The shrink-swell potential generally is high in very clayey soils and low in very sandy soils. Generally, a high shrink-swell potential indicates that the soil material is hazardous to use for engineering structures.

Some soils tend to cause corrosion of concrete conduits. The ratings in table 8 are only estimates of expected corrosivity. Extensive installations that cross soil boundaries or horizons are more likely to be damaged by corrosion than installations placed entirely in one kind of soil. Because conduits normally are not placed in the surface layer, ratings are not given for that layer.

Engineering interpretations

In tables 9 and 10 the soils in the survey area are given ratings that indicate slight, moderate, or severe limitations for septic tank absorption fields, sewage lagoons, shallow excavations, dwellings without basements, trench-type sanitary landfill, and local roads and streets. The soils are also rated good, fair, and poor as sources of road fill, sand and gravel, and topsoil. Soil features are listed that affect winter grading; pond reservoir areas; construction of embankments, dikes, and levees; drainage of crops and pasture; irrigation; and construction of terraces, diversions, and grassed waterways. The ratings and other interpretations in this table are based on estimated engineering properties of the soils in table 8; on available test data, including those in table 11; and on field experience.

Septic tank absorption fields and sewage lagoons are affected mainly by permeability, location of water table, susceptibility to flooding, and slope. The principal reasons for rating limitations moderate or severe are given.

Shallow excavations are generally less than 6 feet deep and are made for basements, ditches, graves, underground cables, pipelines, and sewers.

Dwellings without basements are buildings less than three stories high. Ratings are based mainly on soil characteristics affecting foundations that extend only into the subsoil, or to a depth of 2 to 3 feet. Soil slope, susceptibility to flooding, seasonal wetness, depth to bedrock, and other conditions are also considered.

Trench-type sanitary landfill is a dug trench used to bury refuse. Soil properties that limit suitability for landfill are seasonally high water table, restricted soil drainage, hazard of flooding, high permeability, high slope gradient, and shallow depth to bedrock. The limitations indicate the need for further investigation, but every site should be investigated before it is selected.

Ratings for local roads and streets are for construction and maintenance of improved roads and streets that have an all-weather surface. They are expected to carry automobile traffic all year, but not fast moving, heavy trucks.

Road fill is the material used as an embankment to support the subbase and base course or surface course. The ratings indicate performance of soil material

TABLE 8.—*Estimates of soil*

[An asterisk in the first column indicates that at least one mapping unit in this series is made up of two or more kinds of for referring to other series that appear in the first column. The

Soil series and map symbols	Depth to seasonal high water table	Depth from surface	Classification		
			USDA texture	Unified	AASHO
	Feet	*Inches*			
Atlas	1–3	0–5	Silt loam	ML or CL	A–4 or A–6
Mapped only with Hickory soils.		5–20	Silty clay loam	CL	A–6 or A–7
		20–69	Clay loam	CL	A–7
		69–85	Clay loam	CL	A–6 or A–7
Atterberry: 61	1–3	0–13	Silt loam	ML or CL	A–4 or A–6
		13–46	Silty clay loam	CL	A–7
		46–54	Silt loam	ML or CL	A–4 or A–6
Bloomfield	>5	0–80	Fine sand	SM or SP	A–2 or A–3
Mapped only with Lamont and Tell soils.					
Blown-out land: 63	>5	0–60	Sand	SM or SP	A–2 or A–3

moved from borrow areas for these purposes.

Sand and gravel ratings are based on the probability that delineated areas of soil contain deposits of sand or gravel, and they provide guidance about where to look for it. The ratings do not indicate quality or size of the deposits.

Topsoil ratings are based on the suitability of soil material for spreading over barren surfaces and lawns and gardens and thereby improving soil conditions for establishing and maintaining adapted vegetation.

The suitability of the soils for winter grading depends on the ease with which soil can be moved and traversed by ordinary construction equipment during cold weather. The factors considered are susceptibility to freezing, ease of excavating and compacting frozen soil, internal soil drainage, and slope gradient.

Pond reservoir areas are affected mainly by loss of water through seepage. Soil features that influence seepage are depth to seasonal high water table, depth to unfavorable material that allows seepage, and soil slope.

Soil features important to the use of soils for constructing embankments, dikes, and levees are given. Both the subsoil and underlying material are evaluated where they are contrasting and have significant thickness for use as borrow.

Drainage for crops and pasture is affected mainly by permeability, depth to water table, susceptibility to flooding, and stability of ditchbanks.

Irrigation refers mainly to sprinkler irrigation. Features important to irrigation include the available water capacity, permeability, intake rate, slope, and natural drainage of the soil.

The factors considered for terraces, diversions, and grassed waterways are those features and qualities that affect their layout and construction as well as the establishment, growth, and maintenance of plants. Features considered include soil slope, subsoil texture, depth to bedrock or other limiting layers, and erodibility of soil material.

Engineering test data

Table 11 shows test data for samples of several types of soil in Rock Island County. The test results do not represent the entire range of characteristics of soils within the county nor do they represent the entire range of characteristics of the soils tested. Nevertheless, the results can be used as a general guide in estimating properties of other soils in the county.

Moisture density data are obtained by compacting soil material at a successively higher moisture content. Assuming that the compactive effort remains constant, the density of the compacted material increases until the optimum moisture content is reached. After that, the density decreases with increase in moisture content. The highest dry density obtained in the compaction test is termed *maximum dry density*. As a rule, optimum stability is obtained if the soil is compacted to about the maximum dry density when it is at approximately the *optimum moisture content*.

Mechanical analysis refers to the measurement of the amounts of various size classes of soil grains (sand, silt, or clay) in a sample. Proportions of the size classes determine the textural class of the material. Names used by engineers for various size classes of particles differ from those used in soil science. For example, fine sand in engineering consists of particles 0.42 to 0.074 millimeter in diameter, and in soil science fine sand consists of particles 0.25 to 0.10 millimeter in diameter. Many of these terms are defined in the Glossary.

The tests to determine liquid limit and plastic limit measure the effect of water on the consistence of the soil material. As the moisture content of a clayey soil increases from a very dry state, the material changes from a semi solid to a plastic. As the moisture content is further increased, the material changes from a plastic to a liquid. The plastic limit is the moisture content at which the soil material passes from a semisolid to a plastic. The liquid limit is the moisture content at

properties significant in engineering

soil that may have different properties and limitations. For this reason it is necessary to follow carefully the instructions
symbol > means more than; the symbol < means less than]

Percentage passing sieve—			Permeability	Available water capacity	Reaction	Shrink-swell potential	Corrosivity potential for concrete conduits[1]
No. 4 (4.7 mm)	No. 10 (2.0 mm)	No. 200 (0.074 mm)					
			Inches per hour	*Inches per inch of soil*	*pH*		
95–100	90–100	60–95	0.6–2.0	0.22–0.24	6.1–7.3	Low.	
95–100	80–100	75–95	0.6–2.0	0.18–0.20	5.6–6.5	Moderate	Low to moderate.
90–100	90–100	70–90	<0.06	0.11–0.13	5.1–6.0	High	Moderate.
90–100	90–100	60–80	0.2–2.0	0.14–0.16	6.1–7.8	Moderate	Low.
---	100	95–100	0.6–2.0	0.22–0.24	6.1–7.8	Low.	
---	100	95–100	0.2–2.0	0.18–0.20	5.1–7.3	Moderate	Low.
---	100	95–100	0.6–2.0	0.20–0.22	5.6–7.8	Low	Low.
---	100	0–15	6.0–20	0.05–0.09	6.6–7.3	Low	Low.
---	100	0–15	>20	0.05–0.07	5.6–6.5	Low	Moderate.

TABLE 8.—*Estimates of soil properties*

Soil series and map symbols	Depth to seasonal high water table	Depth from surface	Classification		
			USDA texture	Unified	AASHO
	Feet	*Inches*			
Bold Mapped only with Sylvan soils.	>5	0–60	Silt	ML	A–4
Borrow pit: B.P. No valid estimates can be made. Onsite determination is necessary.					
*Burkhardt: 961A For Saude part, see Saude series.	>5	0–24 24–40	Sandy loam Sand and fine gravel	SM or SC SP or SM	A–2 or A–4 A–1
Calco: 400, W400	[1]0–1	0–54 54–60	Silty clay loam Silt loam	CL, CH or OH ML or CL	A–7 A–4 or A–6
Canisteo: 347	0–1	0–18 18–36 36–62	Silt loam Silt loam Stratified loam and silt loam.	ML or CL ML or CL ML or CL	A–4 or A–6 A–4 or A–6 A–4 or A–6
Chute Mapped only with Strawn soils.	>5	0–60	Fine sand	SM	A–2
Clayey terrace escarpments: 577 No valid estimates can be made. Onsite determination is necessary.	3–5				
Coatsburg Mapped only with Velma soils.	0–1	0–18 18–54 54–84	Silty clay loam Silty clay Clay loam	CL CH CL	A–6 or A–7 A–7 A–6 or A–7
Coffeen: 428	[1]1–3	0–19 19–44 44–49 49–69	Silt loam Silt loam Sand Sandy clay loam	ML ML SM or SP SC	A–4 A–4 A–2 or A–3 A–6
Coyne: 764A, 764C	>5	0–23 23–42 42–55 55–60	Fine sandy loam Fine sandy loam Silty clay loam Sand and fine gravel	SM or SC SM or SC CL SP or SM	A–2 or A–4 A–2 or A–4 A–6 A–1
Cut and fill land: C.F. Too variable to rate; onsite determination is necessary.					
Denny: 45	0–1	0–14 14–58 58–61	Silt loam Silty clay loam Silt loam	ML or CL CL or CH ML or CL	A–4 or A–6 A–7 A–4 or A–6
Dickinson: 87A, 87C	>5	0–13 13–35 35–60	Sandy loam Sandy loam Sand and fine and medium gravel.	SM or SC SM or SC SP or SM	A–2 or A–4 A–2 or A–4 A–1 or A–3
Dorchester: 239	[1]3–5	0–8 8–26 26–65	Silt loam Fine sandy loam Silt loam	ML or CL SM or SC ML or CL	A–4 or A–6 A–4 A–4 or A–6, A–7
Downs: 386A, 386B	>5	0–11 11–46 46–60	Silt loam Silty clay loam Silt loam	ML or CL CL CL	A–4 or A–6 A–7 A–6
Elkhart: 567D2, 567E2	>5	0–10 10–27 27–60	Silt loam Silty clay loam Silt loam	ML or CL CL ML or CL	A–4 or A–6 A–6 or A–7 A–4 or A–6
Fayette: 280B, 280C2, 280D2, 280D3	>5	0–10 10–60 60–70	Silt loam Silty clay loam Silt loam	ML or CL CL ML or CL	A–4 or A–6 A–6 or A–7 A–4 or A–6
Gravelly terrace escarpments: G577	>5	0–60	Coarse sand and fine gravel.	SP or SM	A–1

significant in engineering—Continued

Percentage passing sieve—			Permeability	Available water capacity	Reaction	Shrink-swell potential	Corrosivity potential for concrete conduits[1]
No. 4 (4.7 mm)	No. 10 (2.0 mm)	No. 200 (0.074 mm)	*Inches per hour*	*Inches per inch of soil*	*pH*		
---	100	90–100	0.6–2.0	0.17–0.19	7.9–8.4	Low	Low.
90–100	80–90	20–40	2.0–6.0	0.12–0.15	5.1–6.5	Low	Moderate.
60–80	50–70	0–15	6.0–20	0.02–0.04	5.6–6.5	Low	Moderate.
100	95–100	85–95	0.2–0.6	0.21–0.23	7.9–8.4	High	Low.
95–100	90–100	70–90	0.6–2.0	0.20–0.22	7.9–8.4	Low	Low.
---	100	70–90	0.6–2.0	0.22–0.24	7.9–8.4	Low.	
---	100	70–90	0.6–2.0	0.22–0.24	7.9–8.4	Low	Low.
100	90–100	60–80	0.6–2.0	0.17–0.22	7.4–8.4	Low	Low.
100	100	20–35	6.0–20	0.05–0.09	6.6–8.4	Low	Low.
---	100	85–95	0.6–2.0	0.21–0.23	5.6–7.3	Moderate.	
90–100	90–100	75–90	<0.06	0.10–0.13	5.6–6.5	High	Low to moderate.
90–100	80–100	60–75	0.2–0.6	0.14–0.16	6.1–7.3	Moderate	Low.
---	100	60–80	0.6–2.0	0.22–0.24	5.6–7.3	Low.	
---	100	60–80	0.6–2.0	0.20–0.22	5.6–7.3	Low	Low.
100	95–100	0–15	6.0–20	0.05–0.07	5.6–7.3	Low	Low.
---	100	30–50	0.6–2.0	0.15–0.17	5.6–7.3	Moderate	Low.
100	95–100	20–40	2.0–6.0	0.13–0.15	5.6–7.3	Low.	
100	95–100	20–40	2.0–6.0	0.12–0.14	5.6–6.5	Low	Moderate.
---	100	80–95	0.6–2.0	0.18–0.20	5.6–6.5	Moderate	Low to moderate.
60–80	70–90	0–15	6.0–20	0.02–0.04	5.6–7.3	Low	Low to moderate.
100	95–100	95–100	0.2–0.6	0.22–0.24	5.6–6.5	Low.	
---	100	95–100	0.06–0.2	0.18–0.20	5.1–6.5	Moderate to high.	Moderate.
---	100	95–100	0.2–0.6	0.20–0.22	6.1–7.8	Low	Low to moderate.
---	100	30–40	2.0–6.0	0.13–0.15	6.1–7.3	Low.	
---	100	20–40	2.0–6.0	0.12–0.14	6.1–7.3	Low	Low.
95–100	60–80	0–15	6.0–20	0.02–0.04	6.1–7.3	Low	Low.
---	100	80–100	0.6–2.0	0.22–0.24	7.4–8.4	Low.	
---	100	35–50	2.0–6.0	0.15–0.17	7.4–8.4	Low	Low.
---	100	80–100	0.6–2.0	0.20–0.22	7.4–8.4	Moderate	Low.
---	100	95–100	0.6–2.0	0.22–0.24	5.1–6.0	Moderate.	
---	100	95–100	0.6–2.0	0.18–0.20	5.1–6.0	Moderate	Moderate.
---	100	95–100	0.6–2.0	0.20–0.22	5.6–7.3	Low	Low to moderate.
---	100	95–100	0.6–2.0	0.22–0.24	5.6–7.3	Low.	
---	100	95–100	0.6–2.0	0.18–0.20	5.6–7.8	Moderate	Low.
---	100	95–100	0.6–2.0	0.20–0.22	7.9–8.4	Low	Low.
---	100	95–100	0.6–2.0	0.22–0.24	6.1–7.3	Low.	
---	100	95–100	0.6–2.0	0.18–0.20	5.1–6.5	Moderate	Low to moderate.
---	100	95–100	0.6–2.0	0.20–0.22	5.6–7.3	Low	Low to moderate.
60–80	50–70	0–15	6.0–20	0.02–0.04	5.6–6.5	Low	Moderate.

TABLE 8.—*Estimates of soil properties*

Soil series and map symbols	Depth to seasonal high water table	Depth from surface	Classification		
			USDA texture	Unified	AASHO
	Feet	*Inches*			
Gravel pit: G.P. No estimate of properties.					
*Hickory: 8E2, 8E3, 8F, 8F3, 945E2, 945F, 945G, 946E3, 946F3, 960E2, 960E3, 960F, 960F3, 960G. For High Gap part of 945E2, 945F, and 945G, see High Gap series. For Atlas part of 946E3, 946F3, see Atlas series. For Sylvan and Fayette parts of 960E2, 960E3, 960F, 960F3, 960G, see Sylvan and Fayette series.	3–5	0–10 10–17 17–48 48–58	Silt loam Silty clay loam Clay loam Silt loam	ML or CL CL CL ML or CL	A–4 or A–6 A–6 A–6 or A–7 A–4 or A–6
High Gap[3] Mapped only with Hickory soils.	3–5	0–13 13–37 37–55	Silt loam Clay loam Silty clay shale	ML or CL CL CL	A–4 or A–6 A–6 or A–7 A–7
Hitt variant:[3] V506A	>5	0–14 14–20 20–30 30–60	Loam Clay loam Sandy loam Limestone bedrock.	ML or CL CL SM or SC	A–4 or A–6 A–6 or A–7 A–2 or A–4
Hoopeston: 172	1–3	0–15 15–22 22–42	Sandy loam Sandy loam Stratified sand, sandy loam, loamy sand.	SM or SC SM or SC SM or SC	A–2 or A–4 A–2 or A–4 A–2
Joslin: 763A, 763B	>5	0–14 14–48 48–60 60–85	Silt loam Silt loam Silty clay Silt loam	ML or CL ML or CL CH ML or CL	A–4 or A–6 A–4 or A–6 A–7 A–4 or A–6
Joy: 275	1–3	0–14 14–48 48–60	Silt loam Silt loam Silt loam	ML, CL, or OL ML or CL ML or CL	A–6 or A–4 A–4 or A–6 A–4 or A–6
*Lamont: 947C2, 947F2 For Tell part of 947C2 and 947F2, see Tell series; for Bloomfield part, see Bloomfield series.	>5	0–11 11–28 28–63	Fine sandy loam Fine sandy loam Fine sandy loam with layers of sand.	SM or ML SM or ML SM or SP	A–4 A–4 A–2 or A–3
Landes: 304	[2]3–5	0–29 29–39 39–60	Loamy sand Loam Sand	SM CL SM or SP	A–2 A–6 A–2 or A–3
Lawler: 647	1–3	0–15 15–28 28–60	Loam Sandy clay loam Sand and fine gravel	ML or CL SC or CL SP or SM	A–7 or A–6 A–6 A–1
Lawson: 451	[2]1–3	0–60	Silt loam	ML or CL	A–4 or A–6
Marsh: 718. Too wet to make accurate determinations. Onsite investigations are necessary.					
Martinsville: 570B, 570D3, 570E3	>5	0–12 12–42 42–60	Loam Clay loam Stratified silt loam, loam, and sandy loam.	ML or CL CL ML or CL, SM or SC	A–4 or A–6 A–6 or A–7 A–2, A–4, or A–6
Millington: 82, W82	[2]0–1	0–40 40–60	Silt loam Sand	ML, CL, or OL SM or SP	A–4 or A–6 A–2 or A–3
Millsdale[3]: 317	0–1	0–15 15–27 27–60	Silty clay loam Silty clay Limestone bedrock.	CL, CH, or OH CH	A–7 A–7

significant in engineering—Continued

Percentage passing sieve—			Permeability	Available water capacity	Reaction	Shrink-swell potential	Corrosivity potential for concrete conduits[1]
No. 4 (4.7 mm)	No. 10 (2.0 mm)	No. 200 (0.074 mm)	*Inches per hour*	*Inches per inch of soil*	*pH*		
95–100	90–100	60–95	0.6–2.0	0.22–0.24	5.1–7.8	Low.	
95–100	90–100	55–95	0.6–2.0	0.18–0.20	4.5–6.0	Moderate	Moderate to high.
95–100	90–100	55–80	0.6–2.0	0.15–0.19	4.5–6.0	Moderate	Moderate to high.
90–100	80–95	60–80	0.2–2.0	0.20–0.22	6.6–8.4	Low	Low.
95–100	90–100	60–90	0.6–2.0	0.22–0.24	5.1–6.5	Low.	
95–100	90–100	60–80	0.6–2.0	0.15–0.19	4.5–6.5	Moderate	Moderate to high.
----------	100	90–100	<0.06	0.10–0.12	6.6–8.4	High	Low.
95–100	90–100	60–75	0.6–2.0	0.20–0.22	6.6–7.8	Low.	
95–100	90–100	70–80	0.6–2.0	0.15–0.19	6.6–7.8	Moderate	Low.
95–100	90–100	30–40	2.0–6.0	0.12–0.14	6.6–7.8	Low	Low.
----------	100	30–40	2.0–6.0	0.13–0.15	5.1–6.5	Low.	
----------	100	30–40	2.0–6.0	0.12–0.14	5.1–6.5	Low	Moderate to high.
----------	100	15–35	6.0–20	0.05–0.13	5.6–7.8	Low	Low to moderate.
----------	100	70–90	0.6–2.0	0.22–0.24	6.6–7.8	Low.	
----------	100	75–95	0.6–2.0	0.20–0.22	5.6–6.5	Low	Low to moderate.
----------	100	90–95	0.2–0.6	0.10–0.12	6.1–7.3	High	Low.
95–100	90–100	75–95	0.6–2.0	0.20–0.22	6.6–8.4	Low	Low.
----------	100	95–100	0.6–2.0	0.22–0.24	6.1–7.3	Low.	
----------	100	95–100	0.6–2.0	0.20–0.22	6.1–7.3	Low	Low.
----------	100	95–100	0.6–2.0	0.20–0.22	6.6–7.8	Low	Low.
----------	100	40–60	2.0–6.0	0.16–0.18	5.1–7.3	Low.	
----------	100	40–60	2.0–6.0	0.15–0.17	5.6–6.5	Low	Moderate.
----------	100	0–15	6.0–20	0.05–0.16	5.6–6.5	Low	Moderate.
----------	100	15–30	6.0–20	0.10–0.12	6.1–7.3	Low.	
----------	100	60–75	0.6–2.0	0.17–0.19	6.1–7.3	Low	Low.
----------	100	0–15	6.0–20	0.05–0.07	6.1–7.3	Low	Low.
----------	100	60–75	0.6–2.0	0.20–0.22	5.6–6.5	Moderate.	
----------	100	45–55	0.6–2.0	0.16–0.18	5.6–6.5	Moderate	Low to moderate.
60–80	50–70	0–15	6.0–20	0.02–0.04	5.6–6.5	Low	Low to moderate.
----------	100	70–90	0.6–2.0	0.22–0.24	6.1–7.8	Low to moderate.	Low.
95–100	90–100	60–75	0.6–2.0	0.20–0.22	5.6–6.5	Low.	
95–100	90–100	70–80	0.6–2.0	0.15–0.19	5.1–6.5	Moderate	Low to moderate.
90–100	80–95	30–80	0.6–2.0	0.11–0.22	5.6–6.5	Low	Low to moderate.
100	90–100	60–90	0.6–2.0	0.22–0.24	7.9–8.4	Low	Low.
95–100	90–100	0–15	6.0–20	0.05–0.07	7.9–8.4	Low	Low.
95–100	90–100	80–85	0.6–2.0	0.21–0.23	6.6–7.8	Moderate.	
90–100	90–100	80–90	0.06–0.6	0.11–0.13	6.6–7.8	High	Low.

TABLE 8.—*Estimates of soil properties*

Soil series and map symbols	Depth to seasonal high water table	Depth from surface	Classification		
			USDA texture	Unified	AASHO
	Feet	*Inches*			
Mixed alluvial land: 455. No valid estimates can be made. Onsite determination is necessary.					
Montgomery: 465	0–1	0–14	Silty clay loam	CL, CH, or OH	A–7
		14–46	Silty clay	CH	A–7
		46–64	Clay	CH	A–7
		64–74	Silty clay loam	CL	A–6 or A–7
Muscatine: 41	1–3	0–20	Silt loam	ML, CL, or OL	A–6 or A–7
		20–57	Silty clay loam	CL	A–7
		57–60	Silt loam	ML or CL	A–6 or A–7
Niota: 261	0–1	0–14	Silt loam	ML or CL	A–4 or A–6
		14–24	Silty clay	CH	A–7
		24–53	Silty clay loam	CH	A–7
		53–60	Silt loam and silty clay loam.	ML or CL	A–6 or A–7
Oakville: 741C, 741F	>5	0–64	Fine sand	SM	A–2
Orion: 415	[2]1–3	0–27	Silt loam	ML or CL	A–4 or A–6
		27–45	Silt loam	ML or CL	A–4 or A–6
Otter: 76, W76	[2]0–1	0–31	Silt loam	ML, CL, or OL	A–6 or A–7
		31–64	Silt loam	ML or CL	A–4 or A–6
Port Byron: 277A, 277B	>5	0–16	Silt loam	ML, CL, or OL	A–4, A–6, or A–7
		16–47	Silt loam	ML or CL	A–4 or A–6
		47–60	Silt loam	ML or CL	A–4 or A–6
Quarry: Qu. No estimate of properties.					
Raddle: 430A, 430B	3–5	0–19	Silt loam	ML	A–4
		19–48	Silt loam	ML	A–4
		48–52	Fine sandy loam	SM or ML	A–4
		52–71	Silt loam	ML or CL	A–4 or A–6
Radford: 74	[2]1–3	0–27	Silt loam	ML or CL	A–4 or A–6
		27–64	Silty clay loam	CL	A–6 or A–7
Rozetta: 279	3–5	0–8	Silt loam	ML or CL	A–4 or A–6
		8–62	Silty clay loam	CL	A–6 or A–7
		62–68	Silt loam	ML or CL	A–4 or A–6
Sable: 68	0–1	0–23	Silty clay loam	CL, CH, or OH	A–7
		23–57	Silty clay loam	CL or CH	A–7
		57–60	Silt loam	ML or CL	A–4 or A–6
Saude: 774	>5	1–29	Loam	SM or ML	A–4
		29–40	Sand and fine gravel	SP or SM	A–1
Sawmill: 107, W107	[2]0–1	0–32	Silty clay loam	CL, CH, or OH	A–7
		32–60	Silty clay loam	CL	A–6 or A–7
*Seaton: 274B, 274C2, 274D2, 274E2, 942D2, 942E2, 942F2, 943D2, 943E2, 943F2. For Oakville part of 942D2, 942E2, and 942F2, see Oakville series. For Timula part of 943D2, 943E2, and 943F2, see Timula series.	>5	0–10	Silt loam	ML or CL	A–4 or A–6
		10–55	Silt loam	ML or CL	A–4 or A–6
		55–65	Silt	ML	A–4
Seaton sandy substratum: 563B	>5	0–8	Silt loam	ML or CL	A–4 or A–6
		8–38	Silt loam	ML or CL	A–4 or A–6
		38–80	Fine sand	SM or SP	A–2 or A–3
Sparta: 88B	>5	0–60	Sand	SM or SP	A–2 or A–3

significant in engineering—Continued

Percentage passing sieve—			Permeability	Available water capacity	Reaction	Shrink-swell potential	Corrosivity potential for concrete conduits[1]
No. 4 (4.7 mm)	No. 10 (2.0 mm)	No. 200 (0.074 mm)	*Inches per hour*	*Inches per inch of soil*	*pH*		
100	95–100	85–100	0.6–2.0	0.21–0.23	6.6–7.8	Moderate.	
100	95–100	90–100	<0.2	0.11–0.13	6.6–7.8	High	Low.
	100	95–100	<0.2	0.08–0.10	6.6–7.8	High	Low.
	100	85–100	0.6–2.0	0.18–0.20	6.6–7.8	Moderate	Low.
	100	95–100	0.6–2.0	0.22–0.24	5.6–7.3	Moderate.	
	100	95–100	0.6–2.0	0.18–0.20	5.6–6.5	Moderate	Low to moderate.
	100	95–100	0.6–2.0	0.20–0.22	6.1–8.4	Moderate	Low.
	100	70–95	0.6–2.0	0.22–0.24	5.1–7.3	Low.	
	100	90–100	0.6–0.2	0.11–0.13	4.5–5.5	High	Moderate to high.
	100	85–100	0.6–2.0	0.18–0.20	4.5–5.5	Moderate	Moderate to high.
	100	70–100	0.6–2.0	0.20–0.22	5.6–6.5	Low	Low to moderate.
	100	20–35	>20	0.05–0.09	6.1–7.3	Low	Low to moderate.
	100	60–80	0.6–2.0	0.20–0.22	6.6–7.8	Low	Low.
	100	70–90	0.6–2.0	0.22–0.24	6.1–7.3	Low to moderate.	Low.
	100	70–90	0.6–2.0	0.22–0.24	6.6–7.8	Moderate	Low.
	100	60–80	0.6–2.0	0.20–0.22	6.6–7.8	Moderate	Low.
	100	95–100	0.6–2.0	0.22–0.24	6.1–7.3	Low.	
	100	95–100	0.6–2.0	0.20–0.22	5.6–7.3	Low	Low to moderate.
	100	95–100	0.6–2.0	0.20–0.22	6.1–8.4	Low	Low.
	100	60–80	0.6–2.0	0.22–0.24	5.6–7.3	Low.	
	100	70–90	0.6–2.0	0.20–0.22	5.6–7.3	Low	Low to moderate.
	95–100	40–55	2.0–6.0	0.11–0.13	5.6–7.3	Low	Low to moderate.
	100	70–90	0.6–2.0	0.20–0.22	5.6–7.8	Low	Low to moderate.
	100	80–100	0.6–2.0	0.22–0.24	6.1–7.3	Low	Low.
	100	85–95	0.6–2.0	0.18–0.20	6.1–7.3	Moderate	Low.
	100	95–100	0.6–2.0	0.22–0.24	6.1–7.3	Low	
	100	95–100	0.6–2.0	0.18–0.20	5.1–6.0	Moderate	Moderate.
	100	95–100	0.6–2.0	0.20–0.22	5.6–8.4	Low.	Low to moderate.
	100	95–100	0.6–2.0	0.21–0.23	6.1–7.8	Moderate.	
	100	95–100	0.6–2.0	0.18–0.20	6.1–7.8	High	Low.
	100	95–100	0.6–2.0	0.20–0.22	6.6–8.4	Low	Low.
100	95–100	40–60	2.0–6.0	0.20–0.22	5.1–6.5	Low	Low to moderate.
60–80	50–70	0–15	6.0–20	0.02–0.04	5.1–6.5	Low	Low to moderate.
100	95–100	85–100	0.2–2.0	0.21–0.23	6.1–7.8	High	Low.
95–100	90–100	80–95	0.2–2.0	0.18–0.20	6.1–7.8	Moderate	Low.
	100	95–100	0.6–2.0	0.22–0.24	6.1–7.3	Low.	
	100	95–100	0.6–2.0	0.20–0.22	5.1–6.5	Low	Low to moderate.
	100	95–100	0.6–2.0	0.17–0.19	5.6–8.4	Low	Low to moderate.
	100	70–90	0.6–2.0	0.22–0.24	6.1–7.3	Low.	
	100	70–95	0.6–2.0	0.20–0.22	5.1–6.5	Low	Low to moderate.
	100	0–15	6.0–20	0.05–0.07	5.1–6.5	Low	Low to moderate.
	100	0–15	6.0–20	0.05–0.09	5.6–6.5	Low	Moderate.

TABLE 8.—*Estimates of soil*

Soil series and map symbols	Depth to seasonal high water table	Depth from surface	Classification		
			USDA texture	Unified	AASHO
	Feet	*Inches*			
*Strawn: 959G For Chute part, see Chute series.	>5	0–6	Loam	ML or CL	A–4 or A–6
		6–23	Clay loam	CL	A–6 or A–7
		23–40	Loam	ML or CL	A–4 or A–6
Stronghurst: 278	1–3	0–10	Silt loam	ML or CL	A–4 or A–6
		10–51	Silty clay loam	CL or CH	A–7
		51–60	Silt loam	ML or CL	A–4 or A–6
*Sylvan: 959G For Bold part of 962F, see Bold series.	>5	0–6	Silt loam	ML or CL	A–4 or A–6
		6–15	Silty clay loam	CL	A–6 or A–7
		15–60	Silt loam	ML or CL	A–4 or A–6
Tama: 36A, 36B, 36C2, 36D2	>5	0–20	Silt loam	ML, CL, OL, or OH	A–6 or A–7
		20–46	Silty clay loam	CL	A–6 or A–7
		46–60	Silty clay loam	CL	A–6
Tell Mapped only with Lamont and Bloomfield soils.	>5	0–25	Silt loam	ML	A–4
		25–60	Loamy fine sand	SM, SP-SM	A–2
Timula Mapped only with Seaton soils.	>5	0–20	Silt loam	ML or CL	A–4 or A–6
		20–50	Silt	ML	A–4
Trempealeau: 765A	>5	0–19	Loam	ML or CL	A–4 or A–6
		19–26	Sandy clay loam	SC	A–6
		26–60	Sand and fine gravel	SP or SM	A–1
*Velma: 250E, 944E2 For Coatsburg part of 944E2, see Coatsburg series.	3–5	0–17	Silt loam	ML or CL	A–4, A–6, or
		17–56	Clay loam	CL	A–6 or A–7
		56–63	Loam	ML or CL	A–4 or A–6
Wabash: 83	[2]0–1	0–40	Clay	CH, OL, or OH	A–7
		40–63	Clay loam	CL or OH	A–6 or A–7
Waukee: 727A	>5	0–33	Loam	ML or CL	A–4 or A–6
		33–60	Loamy fine sand	SM	A–2

[1] Corrosivity is estimated only for the horizons in which conduits are likely to be buried.
[2] Soil subject to flooding.

properties significant in engineering

Percentage passing sieve—			Permeability	Available water capacity	Reaction	Shrink-swell potential	Corrosivity potential for concrete conduits[1]
No. 4 (4.7 mm)	No. 10 (2.0 mm)	No. 200 (0.074 mm)	*Inches per hour*	*Inches per inch of soil*	*pH*		
95–100	90–100	60–75	0.6–2.0	0.20–0.22	6.1–7.3	Low.	
95–100	90–100	60–80	0.6–2.0	0.15–0.19	5.6–7.3	Moderate	Low to moderate.
95–100	90–100	55–75	0.6–2.0	0.17–0.19	7.4–8.4	Low	Low.
	100	95–100	0.6–2.0	0.22–0.24	6.1–7.3	Low.	
	100	95–100	0.2–2.0	0.18–0.20	5.1–6.5	Moderate to high.	Low to moderate.
	100	85–100	0.6–2.0	0.20–0.22	5.6–7.8	Low	Low to moderate.
	100	95–100	0.6–2.0	0.22–0.24	6.1–7.3	Low.	
	100	90–100	0.6–2.0	0.18–0.20	5.6–7.3	Moderate	Low to moderate.
95–100	95–100	90–100	0.6–2.0	0.20–0.22	7.4–8.4	Low	Low.
	100	95–100	0.6–2.0	0.21–0.24	6.1–7.3	Low to moderate.	
	100	95–100	0.6–2.0	0.18–0.20	5.1–6.0	Moderate	Moderate.
	100	95–100	0.6–2.0	0.18–0.22	6.1–8.4	Low to moderate.	Low.
100	95–100	60–80	0.6–20	0.22–0.24	5.1–7.3	Low	Low to moderate.
100	95–100	5–35	6.0–20	0.08–0.10	5.1–7.3	Low	Low to moderate.
	100	95–100	0.6–2.0	0.22–0.24	6.1–7.8	Low.	
	100	90–100	0.6–6.0	0.17–0.19	7.9–8.4	Low	Low.
	100	60–75	0.6–2.0	0.20–0.22	5.1–7.3	Low.	
	100	35–50	0.6–6.0	0.16–0.18	5.1–6.5	Moderate	Low to moderate.
60–80	50–70	0–15	6.0–20	0.02–0.04	5.6–6.5	Low	Low to moderate.
	100	70–90	0.6–2.0	0.22–0.24	5.1–7.3	Low to moderate.	
95–100	90–100	60–80	0.6–2.0	0.15–0.19	5.1–7.3	Moderate	Low to moderate.
90–100	90–100	60–75	0.6–2.0	0.17–0.19	6.1–8.4	Low to moderate.	Low.
	100	75–100	<0.06	0.09–0.13	6.1–7.3	High	Low.
95–100	90–100	60–95	0.6–2.0	0.14–0.16	6.6–8.4	Moderate	Low.
95–100	90–100	60–75	0.6–2.0	0.20–0.22	5.1–6.0	Low	Moderate.
95–100	90–100	15–30	6.0–20	0.05–0.07	5.6–6.5	Low	Low to moderate.

[1] Depth to bedrock is less than 40 inches for the High Gap, Hitt variant, and Millsdale soils.

TABLE 9.—*Engineering*

[An asterisk in the first column indicates that at least one mapping unit in this series is made up of two or more kinds of soil for referring to other series

Soil series and map symbols	Degree and kind of limitation to be considered in land-use planning—			
	Septic tank absorption fields	Sewage lagoons[1]	Shallow excavations	Dwellings without basements
Atlas ---------- Mapped only with Hickory soils.	Severe: very slowly permeable; 12 to 36 inches to seasonal high water table; slope more than 12 percent.	Severe: 12 to 36 inches to seasonal high water table; slope more than 12 percent.	Severe: somewhat poorly drained; 12 to 36 inches to seasonal high water table; slope more than 12 percent.	Severe: slope more than 12 percent; high shrink-swell potential; CH material; high potential frost action.
Atterberry: 61 -------	Severe: 12 to 36 inches to seasonal high water table.	Severe: 12 to 36 inches to seasonal high water table.	Severe: somewhat poorly drained; 12 to 36 inches to seasonal high water table.	Severe: 12 to 36 inches to seasonal high water table; high potential frost action.
Bloomfield ---------- Mapped only with Lamont and Tell soils.	Moderate if slope is less than 12 percent, severe if more than 12 percent.[2]	Severe: permeability is more than 6.0 inches per hour;[3] SM or SP material; slope more than 7 percent in places.	Severe: unstable sidewalls because of fine sand; slope more than 12 percent in places.	Moderate if slope is less than 12 percent, severe if more than 12 percent.
Blown-out land: 63 ---	Slight[3] ----------	Severe: permeability is more than 6.0 inches per hour;[3] SM or SP material.	Severe: unstable sidewalls because of sand.	Slight ----------
Bold ---------- Mapped only with Sylvan soils.	Severe: slope more than 18 percent.	Severe: slope more than 18 percent.	Severe: slope more than 18 percent.	Severe: slope more than 18 percent.
Borrow pit: B.P. ------ No interpretations given. Onsite determination necessary.				
*Burkhardt: 961A ---- For Saude part, see Saude series.	Slight[3] ----------	Severe: permeability is more than 2.0 inches per hour;[3] SP or SM material at a depth of 24 inches or less.	Moderate: unstable sidewalls because of sand and fine gravel at a depth of 24 inches or less.	Slight ----------
Calco: 400, W400 -----	Severe: less than 12 inches to seasonal high water table; subject to flooding.	Severe: less than 12 inches to seasonal high water table; subject to flooding; high organic-matter content.	Severe: poorly drained; less than 12 inches to seasonal high water table; subject to flooding.	Severe: poorly drained; less than 12 inches to seasonal high water table; subject to flooding; high frost action potential.
Canisteo: 347 --------	Severe: less than 12 inches to seasonal high water table.	Severe: less than 12 inches to seasonal high water table.	Severe: poorly drained; less than 12 inches to seasonal high water table.	Severe: poorly drained; less than 12 inches to seasonal high water table; high frost action potential.
Chute ---------- Mapped only with Strawn soils.	Severe: slope is more than 25 percent.	Severe: permeability is more than 6.0 inches per hour;[3] slope is more than 25 percent.	Severe: unstable sidewalls because of fine sand.	Severe: slope is more than 25 percent.
Clayey terrace escarpments. No interpretations given. Onsite determination is necessary.				
Coatsburg ---------- Mapped only with Velma soils.	Severe: slowly permeable; less than 12 inches to seasonal high water table; slope is more than 12 percent.	Severe: less than 12 inches to seasonal high water table; slope is more than 12 percent.	Severe: poorly drained; less than 12 inches to seasonal high water table; slope is more than 12 percent; material mostly silty clay.	Severe: poorly drained; less than 12 inches to seasonal high water table; slope is more than 12 percent; high shrink-swell potential; high frost action potential.

interpretations

that may have different properties and limitations. For this reason it is necessary to follow carefully the instructions that appear in the first column]

Degree and kind of limitation to be considered in land-use planning—Continued		Suitability as a source of—		
Sanitary landfill[2] (trench type)	Local roads and streets	Road fill	Sand and gravel	Topsoil
Severe: 12 to 36 inches to seasonal high water table; high expanding clays.	Severe: slope more than 12 percent; high shrink-swell potential; CL or CH subgrade; highly susceptible to frost heave.	Poor: high shrink-swell potential; CL or CH material.	Unsuitable	Poor: very difficult to reestablish vegetation; slope more than 18 percent in places.
Severe: 12 to 36 inches to seasonal high water table.	Severe: highly susceptible to frost heave.	Fair: moderate shrink-swell potential; somewhat poorly drained; ML or CL material.	Unsuitable	Good.
Severe: permeability is more than 6.0 inches per hour;[3] slope more than 18 percent in places.	Moderate if slope is less than 12 percent; severe if more than 12 percent.	Good if slope is less than 12 percent, fair if more than 12 percent.	Fair for sand: SM or SP material; unsuitable for gravel.	Poor: fine sand texture; slope more than 18 percent in places.
Severe: permeability is more than 6.0 inches per hour.[3]	Slight	Good	Fair for sand: SM or SP material; unsuitable for gravel.	Poor: sand texture.
Severe: slope more than 18 percent.	Severe: slope more than 18 percent.	Fair if slope is less than 30 percent; poor if more than 30 percent.	Unsuitable	Poor: slope more than 18 percent.
Severe: permeability is more than 2.0 inches per hour.[3]	Slight	Good	Fair: SP or SM material at a depth of 24 inches or less.	Good.
Severe: poorly drained; less than 12 inches to seasonal high water table; subject to flooding.	Severe: poorly drained; shrink-swell potential; CL or CH subgrade; highly susceptible to frost heave; subject to flooding.	Poor: high shrink-swell potential; poorly drained.	Unsuitable	Poor: poorly drained.
Severe: poorly drained; less than 12 inches to seasonal high water table.	Severe: poorly drained; highly susceptible to frost heave.	Poor: poorly drained	Unsuitable	Poor: poorly drained.
Severe: permeability is more than 6.0 inches per hour.[3]	Severe: slope is more than 25 percent.	Poor: slope is more than 25 percent.	Poor for sand: SM material; unsuitable for gravel.	Poor: fine sand surface layer; slope is more than 25 percent.
Severe: poorly drained; less than 12 inches to seasonal high water table; silty clay.	Severe: poorly drained; slope is more than 12 percent; high shrink-swell potential; CH subgrade; highly susceptible to frost heave.	Poor: high shrink-swell potential; poorly drained.	Unsuitable	Poor: poorly drained; slope is more than 18 percent in places.

TABLE 9.—*Engineering*

Soil series and map symbols	Degree and kind of limitation to be considered in land-use planning—			
	Septic tank absorption fields	Sewage lagoons[1]	Shallow excavations	Dwellings without basements
Coffeen: 428	Severe: 12 to 36 inches to seasonal high water table; subject to flooding.	Severe: 12 to 36 inches to seasonal high water table; subject to flooding.	Severe: somewhat poorly drained; 12 to 36 inches to seasonal high water table; subject to flooding.	Severe: 12 to 36 inches to seasonal high water table; subject to flooding; high frost action potential.
Coyne: 764A, 764C	Slight if slope is less than 4 percent, moderate if more than 4 percent.	Severe: porous material below bottom of lagoon in most places;[3] slope is more than 7 percent in places.	Slight if slope is less than 4 percent, moderate if more than 4 percent.	Slight if slope is less than 4 percent, moderate if more than 4 percent.
Cut and fill land: C.F. Material is too variable to rate. Onsite determination is necessary.				
Denny: 45	Severe: slowly permeable; less than 12 inches to seasonal high water table.	Severe: less than 12 inches to seasonal high water table.	Severe: poorly drained; less than 12 inches to seasonal high water table.	Severe: poorly drained; less than 12 inches to seasonal high water table; moderate to high shrink-swell potential; CL or CH material; high frost action potential.
Dickinson: 87A, 87C	Slight if slope is less than 4 percent, moderate if more than 4 percent.	Severe: permeability is more than 2.0 inches per hour;[3] SP or SM material below a depth of about 20 inches; slope is more than 7 percent in places.	Severe: unstable sidewalls in underlying sand.	Slight if slope is less than 4 percent, moderate if more than 4 percent.
Dorchester: 239	Severe: subject to flooding.	Severe: subject to flooding.	Severe: subject to flooding.	Severe: subject to flooding.
Downs: 386A, 386B	Slight	Moderate: permeability is 0.6 to 2.0 inches per hour; ML or CL material.	Slight	Moderate: moderate shrink-swell potential; ML or CL material.
Elkhart: 567D2, 567E2	Moderate if slope is less than 12 percent, severe if more than 12 percent.	Severe: slope is more than 7 percent.	Moderate if slope is less than 12 percent, severe if more than 12 percent.	Moderate if slope is less than 12 percent; moderate shrink-swell potential; ML or CL material; severe if slope is more than 12 percent.
Fayette: 280B, 280C2, 280D2, 280D3.	Slight if slope is less than 7 percent, moderate if more than 7 percent.	Moderate if slope is less than 7 percent; permeability is 0.6 to 2.0 inches per hour; ML or CL material; severe if slope is more than 7 percent.	Slight if slope is less than 7 percent, moderate if more than 7 percent.	Moderate: moderate shrink-swell potential; ML or CL material.
Gravelly terrace escarpments: G577.	Slight[3]	Severe: permeability is more than 2 inches per hour;[3] slope is more than 7 percent.	Severe: unstable sidewalls because of coarse sand and fine gravel.	Moderate: slope is more than 7 percent.
Gravel pit: G.P. No estimate of properties.				

interpretations—Continued

Degree and kind of limitation to be considered in land-use planning—Continued		Suitability as a source of—		
Sanitary landfill[3] (trench type)	Local roads and streets	Road fill	Sand and gravel	Topsoil
Severe: 12 to 36 inches to seasonal high water table; subject to flooding.	Severe: highly susceptible to frost heave; subject to flooding.	Fair: somewhat poorly drained; ML or CL material.	Unsuitable	Good.
Severe: porous material below bottom of trench in most places.[3]	Slight to a depth of 40 inches, moderate for CL material below a depth of 40 inches: moderate shrink-swell potential.	Good to a depth of 40 inches, fair for CL material below a depth of 40 inches: moderate shrink-swell potential.	Unsuitable	Good if slope is less than 4 percent, fair if more than 4 percent.
Severe: poorly drained; less than 12 inches to seasonal high water table.	Severe: poorly drained; high shrink-swell potential; CL or CH subgrade; highly susceptible to frost heave.	Poor: high shrink-swell potential; poorly drained.	Unsuitable	Poor: poorly drained.
Severe: permeability is more than 2.0 inches per hour.[3]	Slight if slope is less than 4 percent, moderate if more than 4 percent.	Good	Fair: SP or SM material below a depth of about 20 inches; unsuitable for gravel.	Good if slope is less than 4 percent, fair if more than 4 percent.
Severe: subject to flooding.	Severe: subject to flooding.	Fair: ML or CL material.	Unsuitable	Good.
Moderate: permeability is 0.6 to 2.0 inches per hour; mostly silty clay loam.	Moderate: moderate shrink-swell potential; CL subgrade.	Fair: ML or CL material; moderate shrink-swell potential.	Unsuitable	Fair: surface layer 8 to 16 inches thick.
Slight if slope is less than 12 percent, moderate if more than 12 percent.	Moderate if slope is less than 12 percent: moderate shrink-swell potential; severe if more than 12 percent.	Fair: ML or CL material; moderate shrink-swell potential in CL material.	Unsuitable	Fair: surface layer 8 to 16 inches thick.
Moderate: permeability is 0.6 to 2.0 inches per hour; mostly silty clay loam.	Moderate: moderate shrink-swell potential; CL subgrade.	Fair: ML or CL material; moderate shrink-swell potential.	Unsuitable	Fair for slightly to moderately eroded areas, poor for severely eroded areas.
Severe: permeability is more than 2.0 inches per hour.[3]	Moderate: slope is more than 7 percent.	Good	Fair: SP or SM material.	Poor: sand and fine gravel.

TABLE 9.—*Engineering*

Soil series and map symbols	Degree and kind of limitation to be considered in land-use planning—			
	Septic tank absorption fields	Sewage lagoons[1]	Shallow excavations	Dwellings without basements
*Hickory: 8E2, 8E3, 8F, 8F3, 945E2, 945F, 945G, 946E3, 946F3, 960E2, 960E3, 960F, 960F3, 960G. For High Gap part of 945E2, 945F, and 945G, see High Gap series. For Atlas part of 946E3 and 946F3, see Atlas series. For Sylvan and Fayette parts of 960E2, 960E3, 960F, 960F3, and 960G, see Sylvan and Fayette series.	Severe: slope is more than 12 percent.	Severe: slope is more than 12 percent.	Severe: slope is more than 12 percent.	Severe: slope is more than 12 percent.
High Gap ---------- Mapped only with Hickory soils.	Severe: slope is more than 12 percent; slowly permeable in underlying shale material.	Severe: slope is more than 12 percent.	Severe: slope is more than 12 percent; 20 to 40 inches to shale.	Severe: slope is more than 12 percent; 20 to 40 inches to silty clay shale that is classified CH.
Hitt variant: V506A --	Severe: 20 to 40 inches to limestone bedrock.[3]	Severe: 20 to 40 inches to limestone bedrock.[3]	Severe: 20 to 40 inches to limestone bedrock.	Moderate: 20 to 40 inches to limestone bedrock.
Hoopeston: 172 ------	Severe: 12 to 36 inches to seasonal high water table.[3]	Severe: 12 to 36 inches to seasonal high water table; permeability is more than 2.0 inches per hour.[3]	Severe: somewhat poorly drained; 12 to 36 inches to seasonal high water table; unstable sidewalls in underlying sand.	Severe: 12 to 36 inches to seasonal high water table.
Joslin: 763A, 763B ---	Moderate: moderately slowly permeable in underlying silty clay material.	Moderate: permeability is 0.6 to 2.0 inches per hour below the silty clay layer.	Slight to a depth of 40 inches, severe in the 6- to 18-inch silty clay layer between depths of 40 and 60 inches.	Moderate to a depth of 40 inches: low shrink-swell potential; severe in the 6- to 18-inch silty clay layer between depths of 40 and 60 inches; high shrink-swell potential.
Joy: 275 ----------	Severe: 12 to 36 inches to seasonal high water table.	Severe: 12 to 36 inches to seasonal high water table; high organic-matter content in surface layer.	Severe: somewhat poorly drained; 12 to 36 inches to seasonal high water table.	Severe: 12 to 36 inches to seasonal high water table; high frost action potential.
*Lamont: 947C2, 947F2 For Tell part of 947C2 and 947F2, see Tell series. For Bloomfield part of 947C2 and 947F2, see Bloomfield series.	Moderate if slope is less than 12 percent, severe if more than 12 percent.[3]	Severe: permeability is more than 20 inches per hour;[3] SM or SP material below a depth of 20 inches; slope is more than 7 percent in places.	Severe: unstable sidewalls in underlying sand.	Moderate if slope is less than 12 percent, severe if more than 12 percent.
Landes: 304 ---------	Severe: subject to flooding.	Severe: permeability is more than 2.0 inches per hour; subject to flooding.	Severe: subject to flooding; unstable sidewalls because of sandy material.	Severe: subject to flooding.

interpretations—Continued

Degree and kind of limitation to be considered in land-use planning—Continued		Suitability as a source of—		
Sanitary landfill[2] (trench type)	Local roads and streets	Road fill	Sand and gravel	Topsoil
Moderate if slope is less than 18 percent: clay loam; severe if slope is more than 18 percent.	Severe: slope is more than 12 percent.	Fair if slope is less than 30 percent; moderate shrink-swell potential; ML or CL material; poor if slope is more than 30 percent.	Unsuitable	Fair if slope is less than 18 percent and moderately eroded, poor if slope is more than 18 percent; poor for all severely eroded areas.
Severe: slope is more than 12 percent; silty clay shale at a depth of 20 to 40 inches.	Severe: slope is more than 12 percent; high shrink-swell potential in silty clay shale; CL or CH subgrade.	Poor: CL or CH material; high shrink-swell potential; slope is more than 30 percent in places.	Unsuitable	Poor: difficult to reestablish vegetation; slope is more than 18 percent in places.
Severe: 20 to 40 inches to limestone bedrock.[3]	Moderate: 20 to 40 inches to limestone bedrock; moderate shrink-swell potential in CL material.	Poor: 20 to 40 inches to limestone bedrock.	Unsuitable	Poor: difficult to reestablish vegetation.
Severe: 12 to 36 inches to seasonal high water table; permeability is more than 2.0 inches per hour.[5]	Moderate: somewhat poorly drained; moderately susceptible to frost heave.	Fair: somewhat poorly drained.	Poor: 12 to 36 inches to seasonal high water table.	Good.
Slight, but 6 to 18 inches of silty clay layer between depths of 40 and 60 inches.	Moderate to a depth of 40 inches: ML or CL material; severe in the 6- to 18-inch silty clay layer between depths of 40 and 60 inches; CH material; high shrink-swell potential.	Fair to a depth of 40 inches; ML or CL material; poor in the 6- to 18-inch silty clay layer between depths of 40 and 60 inches; CH material; high shrink-swell potential.	Unsuitable	Good.
Severe: 12 to 36 inches to seasonal high water table.	Severe: highly susceptible to frost heave.	Fair: somewhat poorly drained; ML or CL material.	Unsuitable	Good.
Severe: permeability is more than 20 inches per hour;[6] slope is more than 18 percent in places.	Moderate if slope is less than 12 percent, severe if more than 12 percent.	Good if slope is less than 12 percent, fair if more than 12 percent.	Fair for sand and SM or SP material; unsuitable for gravel.	Fair if slope is less than 12 percent, poor if more than 12 percent.
Severe: subject to flooding; permeability is more than 2.0 inches per hour.[5]	Severe: subject to flooding.	Good	Poor: alluvial material has a high percentage of fines in some strata.	Poor: loamy sand.

TABLE 9.—*Engineering*

Soil series and map symbols	Degree and kind of limitation to be considered in land-use planning—			
	Septic tank absorption fields	Sewage lagoons[1]	Shallow excavations	Dwellings without basements
Lawler: 647	Severe: 12 to 36 inches to seasonal high water table.	Severe: 12 to 36 inches to seasonal high water table; permeability is more than 6.0 inches per hour in underlying sand and gravel;[3] SP or SM material below a depth of about 20 inches.	Severe: somewhat poorly drained; 12 to 36 inches to seasonal high water table; unstable sidewalls in underlying sand and gravel.	Severe: 12 to 36 inches to seasonal high water table.
Lawson: 451	Severe: 12 to 36 inches to seasonal high water table; subject to flooding.	Severe: 12 to 36 inches to seasonal high water table; subject to flooding.	Severe: somewhat poorly drained; 12 to 36 inches to seasonal high water table; subject to flooding.	Severe: 12 to 36 inches to seasonal high water table; subject to flooding; high frost action potential.
Marsh: 718. Severe limitations for all uses; normal high water table.				
Martinsville: 570B, 570D3, 570E3.	Slight if slope is less than 7 percent; moderate if 7 to 12 percent; severe if more than 12 percent.	Moderate if slope is less than 7 percent: permeability is 0.6 to 2.0 inches per hour; severe if slope is more than 7 percent.	Moderate if slope is less than 12 percent: mostly clay loam; severe if slope is more than 12 percent.	Moderate: mostly ML or CL material; severe if slope is more than 12 percent.
Millington: 82, W82	Severe: less than 12 inches to seasonal high water table; subject to flooding.	Severe: less than 12 inches to seasonal high water table; subject to flooding; high organic-matter content.	Severe: poorly drained; less than 12 inches to seasonal high water table; subject to flooding.	Severe: poorly drained; less than 12 inches to seasonal high water table; subject to flooding; high frost action potential.
Millsdale: 317	Severe: less than 12 inches to seasonal high water table; 20 to 40 inches to limestone bedrock; slowly to moderately slowly permeable.	Severe: less than 12 inches to seasonal high water table; 20 to 40 inches to limestone bedrock; high organic-matter content.	Severe: poorly drained; less than 12 inches to seasonal high water table; mostly silty clay above bedrock; 20 to 40 inches to limestone bedrock.	Severe: poorly drained; less than 12 inches to seasonal high water table; high shrink-swell potential; 20 to 40 inches to limestone bedrock; mostly CH material above bedrock.
Mixed alluvial land: 455. Too variable to rate. Onsite determination is necessary.				
Montgomery: 465	Severe: slowly permeable to very slowly permeable; less than 12 inches to seasonal high water table.	Severe: less than 12 inches to seasonal high water table; high organic-matter content in surface layer.	Severe: very poorly drained; less than 12 inches to seasonal high water table; silty clay or clay.	Severe: very poorly drained; less than 12 inches to seasonal high water table; high shrink-swell potential; CH material.
Muscatine: 41	Severe: 12 to 36 inches to seasonal high water table.	Severe: 12 to 36 inches to seasonal high water table; high organic-matter content in surface layer.	Severe: somewhat poorly drained; 12 to 36 inches to seasonal high water table.	Severe: 12 to 36 inches to seasonal high water table; high frost action potential.
Niota: 261	Severe: slowly permeable; less than 12 inches to seasonal high water table.	Severe: less than 12 inches to seasonal high water table.	Severe: poorly drained; less than 12 inches to seasonal high water table; silty clay in part of the subsoil.	Severe: poorly drained; less than 12 inches to seasonal high water table; high shrink-swell potential; silty clay CH layer; high frost action potential.

interpretations—Continued

Degree and kind of limitation to be considered in land-use planning—Continued		Suitability as a source of—		
Sanitary landfill[2] (trench type)	Local roads and streets	Road fill	Sand and gravel	Topsoil
Severe: 12 to 36 inches to seasonal high water table; permeability is more than 6.0 inches per hour in underlying sand and gravel.[3]	Moderate: somewhat poorly drained; moderately susceptible to frost heave.	Fair: somewhat poorly drained.	Fair: SP or SM material below a depth of about 20 inches; 12 to 36 inches to seasonal high water table.	Good.
Severe: 12 to 36 inches to seasonal high water table; subject to flooding.	Severe: highly susceptible to frost heave; subject to flooding.	Fair: somewhat poorly drained; ML or CL material.	Unsuitable	Good.
Moderate if slope is less than 18 percent: mostly clay loam; permeability is 0.6 to 2.0 inches per hour.	Moderate: moderate shrink-swell potential; mostly CL subgrade; severe if slope is more than 12 percent.	Fair: moderate shrink-swell potential; mostly ML or CL material.	Unsuitable	Fair for slightly eroded to moderately eroded areas; poor for severely eroded areas.
Severe: poorly drained; less than 12 inches to seasonal high water table; subject to flooding.	Severe: poorly drained; subject to flooding; highly susceptible to frost heave.	Poor: poorly drained	Unsuitable	Poor: poorly drained.
Severe: poorly drained; less than 12 inches to seasonal high water table; 20 to 40 inches to limestone bedrock; mostly silty clay above bedrock.	Severe: poorly drained; 20 to 40 inches to limestone bedrock; silty clay CH layer; high shrink-swell potential.	Poor: poorly drained; silty clay CH layer; high shrink-swell potential; 20 to 40 inches to limestone bedrock.	Unsuitable	Poor: poorly drained; difficult to reestablish vegetation.
Severe: very poorly drained; less than 12 inches to seasonal high water table; silty clay or clay.	Severe: very poorly drained; CH subgrade; high shrink-swell potential.	Poor: very poorly drained; silty clay and clay CH layers; high shrink-swell potential.	Unsuitable	Poor: very poorly drained; difficult to reestablish vegetation in silty clay.
Severe: 12 to 36 inches to seasonal high water table.	Severe: highly susceptible to frost heave.	Fair: moderate shrink-swell potential; somewhat poorly drained; ML or CL material.	Unsuitable	Good.
Severe: poorly drained; less than 12 inches to seasonal high water table.	Severe: poorly drained; silty clay CH layer; high shrink-swell potential; highly susceptible to frost heave.	Poor: silty clay CH layer; high shrink-swell potential; poorly drained.	Unsuitable	Poor: poorly drained.

TABLE 9.—*Engineering*

Soil series and map symbols	Degree and kind of limitation to be considered in land-use planning—			
	Septic tank absorption fields	Sewage lagoons[1]	Shallow excavations	Dwellings without basements
Oakville: 741C, 741F	Moderate if slope is less than 12 percent, severe if more than 12 percent.[3]	Severe: permeability is more than 6.0 inches per hour; slope is more than 7 percent in places.	Severe: unstable sidewalls in fine sand; slope is more than 12 percent in places.	Moderate if slope is less than 12 percent, severe if more than 12 percent.
Orion: 415	Severe: 12 to 36 inches to seasonal high water table; subject to flooding.	Severe: 12 to 36 inches to seasonal high water table; subject to flooding.	Severe: somewhat poorly drained; 12 to 36 inches to seasonal high water table; subject to flooding.	Severe: 12 to 36 inches to seasonal high water table; subject to flooding; high frost action potential.
Otter: 76, W76	Severe: less than 12 inches to seasonal high water table; subject to flooding.	Severe: less than 12 inches to seasonal high water table; subject to flooding; high organic-matter content.	Severe: poorly drained; less than 12 inches to seasonal high water table; subject to flooding.	Severe: poorly drained; less than 12 inches to seasonal high water table; subject to flooding; high frost action potential.
Port Byron: 277A, 277B.	Slight	Moderate: permeability is 0.6 to 2.0 inches per hour; ML or CL material; slope is 2 to 6 percent in places; high organic-matter content.	Slight	Moderate: ML or CL material.
Quarry: Qu. No estimate of properties.				
Raddle: 430A, 430B	Moderate: 36 to 60 inches to seasonal high water table.	Moderate: 36 to 60 inches to seasonal high water table; permeability is 0.6 to 2.0 inches per hour; mostly ML material; slope is 2 to 6 percent in places.	Slight: 36 to 60 inches to seasonal high water table.	Moderate: ML material
Radford: 74	Severe: 12 to 36 inches to seasonal high water table; subject to flooding.	Severe: 12 to 36 inches to seasonal high water table; subject to flooding.	Severe: somewhat poorly drained; 12 to 36 inches to seasonal high water table; subject to flooding.	Severe: 12 to 36 inches to seasonal high water table; subject to flooding; high frost action potential.
Rozetta: 279	Moderate: 36 to 60 inches to seasonal high water table.	Moderate: 36 to 60 inches to seasonal high water table; permeability is 0.6 to 2.0 inches per hour; ML or CL material.	Moderate: 36 to 60 inches to seasonal high water table.	Moderate: ML or CL material.
Sable: 68	Severe: less than 12 inches to seasonal high water table.	Severe: less than 12 inches to seasonal high water table; high organic-matter content.	Severe: poorly drained; less than 12 inches to seasonal high water table.	Severe: poorly drained; less than 12 inches to seasonal high water table; high shrink-swell potential; high frost action potential.
Saude: 774	Slight[3]	Severe: permeability is more than 2.0 inches per hour;[3] SP or SM material below a depth of about 24 inches.	Moderate: unstable sidewalls in underlying sand and gravel.	Slight

interpretations—Continued

Degree and kind of limitation to be considered in land-use planning—Continued		Suitability as a source of—		
Sanitary landfill[2] (trench type)	Local roads and streets	Road fill	Sand and gravel	Topsoil
Severe: permeability is more than 6.0 inches per hour;[3] slope is more than 18 percent in places.	Moderate if slope is less than 12 percent, severe if more than 12 percent.	Good if slope is less than 12 percent; fair if more than 12 percent.	Poor for sand: SM material; unsuitable for gravel.	Poor: fine sand; slope is more than 18 percent in places.
Severe: 12 to 36 inches to seasonal high water table; subject to flooding.	Severe: highly susceptible to frost heave; subject to flooding.	Fair: somewhat poorly drained; ML or CL material.	Unsuitable	Good.
Severe: poorly drained; less than 12 inches to seasonal high water table; subject to flooding.	Severe: poorly drained; subject to flooding; highly susceptible to frost heave.	Poor: poorly drained	Unsuitable	Poor: poorly drained.
Slight	Moderate: ML or CL subgrade.	Fair: ML or CL material.	Unsuitable	Good.
Slight	Moderate: ML or CL subgrade.	Fair: mostly ML material.	Unsuitable	Good.
Severe: 12 to 36 inches to seasonal high water table; subject to flooding.	Severe: highly susceptible to frost heave; subject to flooding.	Fair: somewhat poorly drained; ML or CL material.	Unsuitable	Good.
Severe: 36 to 60 inches to seasonal high water table.	Moderate: CL subgrade; moderate shrink-swell potential.	Fair: ML or CL material; moderate shrink-swell potential.	Unsuitable	Fair: surface layer 8 to 16 inches thick.
Severe: poorly drained; less than 12 inches to seasonal high water table.	Severe: poorly drained; highly susceptible to frost heave; CL or CH subgrade.	Poor: poorly drained; high shrink-swell potential; CL or CH subgrade.	Unsuitable	Poor: poorly drained.
Severe: permeability is more than 2.0 inches per hour.[3]	Slight	Good	Fair: SP or SM material below a depth of 24 inches.	Good.

TABLE 9.—*Engineering*

Soil series and map symbols	Degree and kind of limitation to be considered in land-use planning—			
	Septic tank absorption fields	Sewage lagoons[1]	Shallow excavations	Dwellings without basements
Sawmill: 107, W107	Severe: less than 12 inches to seasonal high water table; subject to flooding; moderately permeable to moderately slowly permeable.	Severe: less than 12 inches to seasonal high water table; subject to flooding; high organic-matter content.	Severe: poorly drained; less than 12 inches to seasonal high water table; subject to flooding.	Severe: poorly drained; less than 12 inches to seasonal high water table; subject to flooding; high shrink-swell potential; high frost action potential.
*Seaton: 274B, 274C2, 274D2, 274E2, 942D2, 942E2, 942F2, 943D2, 943E2, 943F2. For Oakville part of 942D2, 942E2, and 942F2, see Oakville series. For Timula part of 943D2, 943E2, and 943F2, see Timula series.	Slight if slope is less than 7 percent, moderate if 7 to 12 percent, severe if more than 12 percent.	Moderate if slope is less than 7 percent: permeability is 0.6 to 2.0 inches per hour; ML or CL material; severe if slope is more than 7 percent.	Slight if slope is less than 7 percent, moderate if 7 to 12 percent, severe if more than 12 percent.	Moderate if slope is less than 12 percent: ML or CL material; severe if slope is more than 12 percent.
Seaton sandy substratum: 563B.	Slight[3]	Moderate in silt loam: permeability is 0.6 to 2.0 inches per hour; severe in underlying sand: permeability is more than 6.0 inches per hour;[3] SM or SP material.	Severe: unstable sidewalls in underlying sand.	Moderate: silt loam ML or CL material; underlying sand is SM or SP.
Sparta: 88B	Slight[3]	Severe: permeability is more than 6.0 inches per hour;[3] SM or SP material.	Severe: unstable sidewalls in sand.	Slight
*Strawn: 959G For Chute part of 959G, see Chute series.	Severe: slope is more than 25 percent.	Severe: slope is more than 25 percent.	Severe: slope is more than 25 percent.	Severe: slope is more than 25 percent.
Stronghurst: 278	Severe: 12 to 36 inches to seasonal high water table; moderately permeable to moderately slowly permeable.	Severe: 12 to 36 inches to seasonal high water table.	Severe: somewhat poorly drained; 12 to 36 inches to seasonal high water table.	Severe: 12 to 36 inches to seasonal high water table; high shrink-swell potential; high frost action potential.
*Sylvan: 19D3, 19E, 19E3, 19F, 19F3, 962F For Bold part of 962F, see Bold series.	Moderate if slope is less than 12 percent, severe if more than 12 percent.	Severe: slope is more than 7 percent.	Moderate if slope is less than 12 percent, severe if more than 12 percent.	Moderate if slope is less than 12 percent, severe if more than 12 percent: moderate shrink-swell potential; ML or CL material.
Tama: 36A, 36B, 36C2, 36D2.	Slight if slope is less than 7 percent, moderate if more than 7 percent.	Moderate if slope is less than 7 percent: ML or CL material; severe if slope is more than 7 percent; 36 to 60 inches to seasonal high water table; high organic-matter content.	Slight if slope is less than 7 percent, moderate if more than 7 percent.	Moderate: ML or CL material; moderate shrink-swell potential.
Tell Mapped only with Lamont and Bloomfield soils.	Moderate if slope is less than 12 percent, severe if more than 12 percent.[3]	Severe: permeability is more than 6.0 inches per hour in underlying loamy fine sand.[3]	Severe: unstable sidewalls in underlying loamy fine sand.	Moderate if slope is less than 12 percent, severe if more than 12 percent; silt loam ML material; underlying loamy fine sand is SM material.

interpretations—Continued

Degree and kind of limitation to be considered in land-use planning—Continued		Suitability as a source of—		
Sanitary landfill[3] (trench type)	Local roads and streets	Road fill	Sand and gravel	Topsoil
Severe: poorly drained; less than 12 inches to seasonal high water table; subject to flooding.	Severe: poorly drained; subject to flooding; CL or CH subgrade; high shrink-swell potential; highly susceptible to frost heave.	Poor: poorly drained; CL or CH material; high shrink-swell potential.	Unsuitable	Poor: poorly drained.
Slight if slope is less than 12 percent, moderate if 12 to 18 percent, severe if more than 18 percent.	Moderate if slope is less than 12 percent: ML or CL material; severe if slope is more than 12 percent.	Fair: ML or CL material.	Unsuitable	Good if slope is less than 7 percent, fair if 7 to 18 percent, poor if more than 18 percent.
Severe: permeability below a depth of about 40 inches is more than 6.0 inches per hour.[3]	Moderate: silt loam ML or CL material; underlying fine sand is SM or SP.	Fair: silt loam ML or CL material; underlying fine sand is SM or SP.	Fair for sand: underlying fine sand is SM or SP.	Good.
Severe: permeability is more than 6.0 inches per hour.[3]	Slight	Good	Fair for sand: SM or SP material.	Poor: sand surface layer.
Severe: slope is more than 25 percent.	Severe: slope is more than 25 percent.	Poor: slope is more than 25 percent.	Unsuitable	Poor: slope is more than 25 percent.
Severe: 12 to 36 inches to seasonal high water table.	Severe: CL or CH subgrade; high shrink-swell potential; highly susceptible to frost heave.	Poor: CL or CH material; high shrink-swell potential.	Unsuitable	Fair: surface layer 8 to 16 inches thick.
Slight if slope is less than 12 percent, moderate if 12 to 18 percent, severe if more than 18 percent.	Moderate if slope is less than 12 percent, severe if more than 12 percent: ML or CL subgrade; moderate shrink-swell potential.	Fair if slope is less than 30 percent, poor if more than 30 percent: ML or CL material; moderate shrink-swell potential.	Unsuitable	Fair if slope is less than 18 percent, poor if more than 18 percent.
Moderate: permeability is 0.6 to 2.0 inches per hour; mostly silty clay loam.	Moderate: ML or CL subgrade; moderate shrink-swell potential.	Fair: ML or CL material; moderate shrink-swell potential.	Unsuitable	Good if slope is less than 7 percent, fair if more than 7 percent.
Severe: permeability is more than 6.0 inches per hour in underlying loamy fine sand.[3]	Moderate if slope is less than 12 percent, severe if more than 12 percent: ML or SM subgrade.	Good if slope is less than 12 percent, fair if more than 12 percent; silt loam ML material; underlying fine sand is SM.	Poor: underlying loamy fine sand SM material; unsuitable for gravel.	Fair if slope is less than 12 percent, poor if more than 12 percent.

TABLE 9.—*Engineering*

Soil series and map symbols	Degree and kind of limitation to be considered in land-use planning—			
	Septic tank absorption fields	Sewage lagoons[1]	Shallow excavations	Dwellings without basements
Timula Mapped only with Seaton soils.	Moderate if slope is less than 12 percent, severe if more than 12 percent.	Severe: slope is more than 7 percent.	Moderate if slope is less than 12 percent, severe if more than 12 percent.	Moderate if slope is less than 12 percent, severe if more than 12 percent: ML or CL material.
Trempealeau: 765A	Slight[2]	Severe: permeability is more than 6.0 inches per hour in underlying sand and fine gravel;[2] SP or SM material below a depth of about 20 inches.	Severe: unstable sidewalls in underlying sand and fine gravel.	Slight
*Velma: 250E, 944E2 For Coatsburg part of 944E2, see Coatsburg series.	Severe: slope is more than 12 percent.	Severe: slope is more than 12 percent.	Severe: slope is more than 12 percent.	Severe: slope is more than 12 percent.
Wabash: 83	Severe: less than 12 inches to seasonal high water table; subject to flooding; very slowly permeable.	Severe: less than 12 inches to seasonal high water table; subject to flooding; high organic-matter content.	Severe: very poorly drained; less than 12 inches to seasonal high water table; subject to flooding; mainly clay.	Severe: very poorly drained; less than 12 inches to seasonal high water table; subject to flooding; high shrink-swell potential.
Waukee: 727A	Slight[2]	Severe: permeability is more than 6.0 inches per hour in underlying loamy fine sand.[2]	Severe: unstable sidewalls in underlying loamy fine sand.	Moderate: loam ML or CL material; underlying loamy fine sand is SM material.

[1] Interpretations for lagoon floors only; for interpretations about material for embankments, see column headed "Embankments, dikes, and levees" in table 10.

[2] Onsite study is needed of the underlying strata and water table to determine the hazards of aquifer pollution and drainage into ground water in landfill deeper than 5 or 6 feet.

interpretations—Continued

Degree and kind of limitation to be considered in land-use planning—Continued		Suitability as a source of—		
Sanitary landfill[2] (trench type)	Local roads and streets	Road fill	Sand and gravel	Topsoil
Slight if slope is less than 12 percent, moderate if 12 to 18 percent, severe if more than 18 percent.	Moderate if slope is less than 12 percent, severe if more than 12 percent: ML subgrade.	Fair: ML material	Unsuitable	Fair if slope is less than 18 percent, poor if more than 18 percent.
Severe: permeability is more than 6.0 inches per hour in underlying sand and fine gravel.[3]	Slight	Good	Fair: SP or SM material below a depth of about 20 inches.	Good.
Moderate: slope is 12 to 18 percent; clay loam.	Severe: slope is more than 12 percent.	Fair: ML or CL material; moderate shrink-swell potential.	Unsuitable	Fair: surface layer 8 to 16 inches thick; slope is more than 12 percent.
Severe: very poorly drained; less than 12 inches to seasonal high water table; subject to flooding; mainly clay.	Severe: very poorly drained; CH or CL subgrade; high shrink-swell potential.	Poor: very poorly drained; CH or CL material; high shrink-swell potential.	Unsuitable	Poor: very poorly drained; clay surface layer.
Severe: permeability is more than 6.0 inches per hour in underlying loamy fine sand.[3]	Slight	Good	Poor: underlying loamy fine sand is SM material; unsuitable for gravel.	Good.

[3] Pollution of ground water is a hazard because the soil or underlying material is very permeable or is creviced.

TABLE 10.—*Engineering*

[An asterisk in the first column indicates that at least one mapping unit in this series is made up of two or more kinds of soil for referring to other series

Soil series and map symbols	Soil features affecting—		
	Winter grading	Pond reservoir areas	Embankments, dikes, and levees
Atlas Mapped only with Hickory soils.	Surface layer and upper part of subsoil freeze hard; difficult to excavate frozen soil and compact material; somewhat poorly drained; slope is more than 12 percent.	Slope is 12 to 30 percent	Subsoil: medium to low shear strength; high compressibility; fair to poor compaction characteristics; poor workability; high shrink-swell potential. Underlying material: medium compressibility; fair to good compaction characteristics; moderate shrink-swell potential; gravel and cobblestones.
Atterberry: 61	Surface layer and upper part of subsoil freeze hard; difficult to excavate frozen soil and compact material; somewhat poorly drained.	Seasonal high water table at a depth of 12 to 36 inches; nearly level.	Subsoil: medium to low shear strength; medium compressibility; fair to good compaction characteristics; moderate shrink-swell potential. Underlying material: medium to low shear strength; medium compressibility; medium to high susceptibility to piping; fair compaction characteristics.
Bloomfield Mapped only with Lamont and Tell soils.	Susceptible to some freezing, depending on moisture content; slope is 30 percent in places.	Rapidly permeable; high seepage potential; slope is 30 percent in places.	Sandy material; highly pervious; droughty; difficult to vegetate.
Blown-out land: 63	Susceptible to freezing in some places, depending on moisture content.	Rapidly permeable; high seepage potential.	Sandy; highly pervious; droughty; difficult to vegetate.
Bold Mapped only with Sylvan soils.	Susceptible to freezing; slope is 18 to 60 percent.	High seepage potential; slope is 18 to 60 percent.	Silty; medium to low shear strength; medium compressibility; high susceptibility to piping; fair to poor compaction characteristics; medium permeability after compaction.
*Burkhardt: 961A For Saude part, see Saude series.	Susceptible to freezing in some places, depending on moisture content.	Highly permeable; high seepage potential.	Sandy and gravelly; highly pervious; droughty; difficult to vegetate.
Borrow pit: B.P. No interpretations. Onsite determination is necessary.			
Calco: 400, W400	Upper 2 to 3 feet freezes hard; difficult to excavate frozen soil and compact material; poorly drained.	Seasonal high water table at a depth of less than 12 inches; nearly level bottom lands; high organic-matter content in upper 2 to 3 feet; subject to flooding.	Medium to low shear strength; high compressibility; fair to poor compaction characteristics; poor workability; high shrink-swell potential; high organic-matter content in upper 2 to 3 feet.
Canisteo: 347	Surface layer and upper part of subsoil freeze hard; difficult to excavate frozen soil and compact material; poorly drained.	Seasonal high water table at a depth of less than 12 inches; nearly level.	Medium to low shear strength; medium compressibility; medium to high susceptibility to piping; fair compaction characteristics; medium permeability after compaction.
Chute Mapped only in complex with Strawn soils.	Susceptible to freezing in some places, depending on moisture content; slope is more than 25 percent.	Rapidly permeable; high seepage potential; slope is more than 25 percent.	Sandy material; highly pervious; droughty; difficult to vegetate.

interpretations for specified uses

that may have different properties and limitations. For this reason it is necessary to follow carefully the instructions that appear in the first column]

Soil features affecting—Continued			
Drainage for crops and pasture	Irrigation	Terraces and diversions	Grassed waterways
Very slowly permeable; seasonal high water table at a depth of 12 to 36 inches; slope is 12 to 30 percent.	Slope is 12 to 30 percent; slow intake rate; seasonal high water table at a depth of 12 to 36 inches; subsoil very slowly permeable; hazard of water erosion.	Slope is 12 to 30 percent ____	Highly erodible; somewhat poorly drained; slope is 12 to 30 percent; seedbed preparation difficult because clayey material is exposed in cuts; seepy in places.
Moderately to moderately slowly permeable; seasonal high water table at a depth of 12 to 36 inches.	Moderate intake rate; seasonal high water table at a depth of 12 to 36 inches; subsoil moderately to moderately slowly permeable.	Not needed; nearly level ____	Not needed; nearly level.
Natural drainage is adequate_	Low available water capacity; slope is 4 to 30 percent; rapidly permeable; susceptible to soil blowing.	Rapidly permeable; little runoff; slope is 30 percent in places; susceptible to soil blowing; droughty; very difficult to vegetate; low available water capacity.	Sandy; subject to accumulations of windblown material; low available water capacity; slope is 30 percent in places; droughty; very difficult to vegetate.
Natural drainage is adequate_	Very low available water capacity; rapidly permeable; susceptible to soil blowing.	Rapidly permeable sand with little runoff; susceptible to soil blowing; droughty; very difficult to vegetate; very low available water capacity.	Sandy; subject to accumulations of windblown material; very low available water capacity; droughty; very difficult to establish and maintain vegetation.
Natural drainage is adequate_	Slope is 18 to 60 percent; highly erodible.	Slope is 18 to 60 percent _____	Highly erodible; slope is 18 to 60 percent; difficult to vegetate; highly susceptible to siltation in channels.
Natural drainage is adequate_	Low available water capacity; moderately rapidly to rapidly permeable; sand and gravel substratum.	Rapidly permeable and little runoff; sand and gravel are exposed by cuts; droughty; difficult to vegetate; low available water capacity.	Sandy loam layer is less than 24 inches to the underlying sand and gravel; low available water capacity; droughty; very difficult to vegetate.
Seasonal high water table at a depth of less than 12 inches; moderately slowly permeable; subject to flooding; surface ponding in places.	Seasonal high water table at a depth of less than 12 inches; moderate intake rate; moderately slowly permeable below surface layer; subject to flooding; surface ponding in places.	Not needed; nearly level bottom land.	Not needed; nearly level bottom land.
Seasonal high water table at a depth of less than 12 inches.	Seasonal high water table at a depth of less than 12 inches; moderate intake rate.	Not needed; nearly level ____	Not needed; nearly level.
Natural drainage is adequate_	Low available water capacity; slope is more than 25 percent; rapidly permeable; susceptible to soil blowing.	Rapidly permeable fine sand; little runoff; slope is more than 25 percent.	Sandy; subject to accumulations of windblown materials; low available water capacity; slope is more than 25 percent; droughty; difficult to vegetate.

TABLE 10.—*Engineering interpretations*

Soil series and map symbols	Soil features affecting—		
	Winter grading	Pond reservoir areas	Embankments, dikes, and levees
Clayey terrace escarpments. No interpretations given. Onsite determination is necessary.			
Coatsburg ---------- Mapped only with Velma soils.	Surface layer and upper part of subsoil freeze hard; difficult to excavate frozen soil and compact material; poorly drained; slope is more than 12 percent.	Slope is 12 to 30 percent -----	Subsoil: medium to low shear strength; high compressibility; fair to poor compaction characteristics; poor workability; high shrink-swell potential. Underlying material: medium to low shear strength; medium compressibility; low to medium susceptibility to piping; fair to good compaction characteristics; moderate shrink-swell potential; gravel and cobblestones.
Coffeen: 428 ----------	Upper 2 to 3 feet freezes hard; difficult to excavate frozen soil and compact material; somewhat poorly drained.	High seepage potential; seasonal high water table at a depth of 12 to 36 inches; nearly level bottom lands; subject to flooding.	Medium shear strength; medium compressibility; medium to low permeability if compacted; medium susceptibility to piping; fair compaction characteristics.
Coyne: 764A, 764C ----	Susceptible to freezing depending on moisture content.	Rapidly permeable below CL material; high seepage potential; slope is 0 to 12 percent.	Subsoil: medium to low shear strength; low to medium compressibility; medium susceptibility to piping; fair compaction characteristics; medium permeability after compaction. Underlying material: medium shear strength; compacted soil highly permeable; medium to high susceptibility to piping; good compaction characteristics.
Cut and fill land: C.F. No interpretations. Material is too variable to rate. Onsite determination is necessary.			
Denny: 45 ----------	Surface layer and upper part of subsoil freeze hard; difficult to excavate frozen soil and compact material; poorly drained.	Seasonal high water table at a depth of less than 12 inches; nearly level.	Subsoil: medium to low shear strength; high compressibility; fair compaction characteristics; moderate to high shrink-swell potential; poor workability. Underlying material: medium to low shear strength; medium compressibility; medium to high susceptibility to piping; fair compaction characteristics.
Dickinson: 87A, 87C ---	Susceptible to freezing, depending on moisture content.	Rapidly permeable; high seepage potential; slope is 0 to 12 percent.	Subsoil: medium shear strength; low to medium compressibility; medium to low permeability after compaction; medium to high susceptibility to piping; good compaction characteristics. Underlying material: compacted soil highly permeable.
Dorchester: 239 -------	Upper 2 to 3 feet freezes hard; difficult to excavate frozen soil and compact material; moderately well drained to well drained.	Seasonal high water table at a depth of 36 to 60 inches; nearly level; subject to flooding; high seepage potential.	Medium to low shear strength; low to medium compressibility; medium to low permeability after compaction; medium susceptibility to piping; fair compaction characteristics.

for specified uses—Continued

Soil features affecting—Continued			
Drainage for crops and pasture	Irrigation	Terraces and diversions	Grassed waterways
Slowly to very slowly permeable; seasonal high water table at a depth of less than 12 inches; slope is 12 to 18 percent.	Seasonal high water table at a depth of less than 12 inches; slope is 12 to 18 percent; moderate intake rate; subsoil slowly to very slowly permeable; hazard of water erosion.	Slope is 12 to 18 percent -----	Highly erodible; poorly drained; slope is 12 to 18 percent; seedbed preparation difficult because of clayey material exposed in cuts; seepy in places.
Seasonal high water table at a depth of 12 to 36 inches; subject to flooding.	Moderate intake rate; seasonal high water table at a depth of 12 to 36 inches; subject to flooding.	Not needed; nearly level bottom land.	Not needed; nearly level bottom land.
Natural drainage is adequate-	Moderate available water capacity; slope is 0 to 12 percent; susceptible to soil blowing.	Fine sandy loam is permeable and little runoff; susceptible to soil blowing; difficult to vegetate; moderate available water capacity.	Sandy; susceptible to wind erosion; moderate available water capacity; difficult to vegetate.
Seasonal high water table at a depth of less than 12 inches; slowly permeable.	Seasonal high water table at a depth of less than 12 inches; slow intake rate; slowly permeable below surface layer.	Not needed; nearly level ----	Not needed; nearly level.
Natural drainage is adequate-	Low available water capacity; moderately rapidly to rapidly permeable; slope is 0 to 12 percent; susceptible to soil blowing.	Rapidly permeable sandy loam layer; little runoff; loose sand is exposed by cuts; susceptible to soil blowing; droughty; difficult to vegetate; low available water capacity.	Sandy loam is less than 40 inches to underlying loose sand; low available water capacity; droughty; difficult to vegetate; subject to accumulation of windblown material.
Seasonal high water table; subject to flooding.	Moderate intake rate; seasonal high water table; subject to flooding.	Not needed; level bottom land.	Not needed; level bottom land.

TABLE 10.—*Engineering interpretations*

Soil series and map symbols	Soil features affecting—		
	Winter grading	Pond reservoir areas	Embankments, dikes, and levees
Downs: 386A, 386B	Surface layer and upper part of subsoil freeze hard; difficult to excavate frozen soil and compact material.	Slope is 0 to 6 percent	Subsoil: medium to low shear strength; medium compressibility; low to medium susceptibility to piping; fair compaction characteristics; moderate shrink-swell potential. Underlying material: medium to low shear strength; medium to low compressibility; medium to high susceptibility to piping; fair compaction characteristics; medium to low permeability after compaction.
Elkhart: 567D2, 567E2	Surface layer and upper part of subsoil freeze hard; difficult to excavate frozen soil and compact material.	Moderate seepage potential in underlying material; slope is 7 to 18 percent.	Subsoil: medium to low shear strength; low to medium susceptibility to piping; fair to good compaction characteristics; moderate shrink-swell potential. Underlying material: medium to low shear strength; medium compressibility; medium to high susceptibility to piping; fair compaction characteristics; moderately low permeability after compaction.
Fayette: 280B, 280C2, 280D2, 280D3.	Surface layer and upper part of subsoil freeze hard; difficult to excavate frozen soil and compact material; slope is more than 30 percent in places.	Slope is mainly 2 to 12 percent, but is more than 12 percent in places.	Subsoil: medium to low shear strength; medium compressibility; low to medium susceptibility to piping; fair to good compaction characteristics; moderate shrink-swell potential. Underlying material: medium to low shear strength; medium compressibility; medium to high susceptibility to piping; fair compaction characteristics; medium to low permeability after compaction.
Gravelly terrace escarpments: G577.	Susceptible to some freezing depending on moisture content.	Rapidly permeable; high seepage potential; slope is more than 7 percent.	Sandy and gravelly; highly pervious; droughty; difficult to vegetate.
Gravel pit: G.P. No estimate of properties.			
*Hickory: 8E2, 8E3, 8F, 8F3, 945E2, 945F, 945G, 946E3, 946F3, 960E2, 960E3, 960F, 960F3, 960G. For High Gap part of 945E2, 945F, and 945G, see High Gap series. For Atlas part of 946E3 and 946F3, see Atlas series. For Sylvan and Fayette parts of 960E2, 960E3, 960F, 960F3, and 960G, see Sylvan and Fayette series.	Surface layer and upper part of subsoil freeze hard; difficult to excavate frozen soil and compact material; slope is mainly 12 to 30 percent, but is 60 percent in places.	Slope is mainly 12 to 30 percent, but is 60 percent in places.	Subsoil: medium to low shear strength; medium compressibility; low to medium susceptibility to piping; fair compaction characteristics; moderate shrink-swell potential; some gravel. Underlying material: medium to low shear strength; medium compressibility; medium to high susceptibility to piping; fair compaction characteristics; gravel and cobblestones; medium to low permeability after compaction.

for specified uses—Continued

Soil features affecting—Continued			
Drainage for crops and pasture	Irrigation	Terraces and diversions	Grassed waterways
Natural drainage is adequate.	Slope is 0 to 6 percent; moderate intake rate; susceptible to water erosion.	Silty clay loam subsoil exposed by cuts; susceptible to siltation in channels.	Susceptible to water erosion; silty clay loam subsoil exposed by deep cuts; subject to siltation in channels.
Natural drainage is adequate.	Slope is 7 to 18 percent; moderate intake rate; highly susceptible to water erosion.	Slope is 7 to 18 percent; silty clay loam subsoil exposed by cuts; in many cuts the highly erosive silty substratum also exposed and difficult to vegetate; susceptible to siltation in channels.	Highly erodible; slope is 7 to 18 percent; silty clay loam subsoil exposed by cuts; in many cuts the highly erodible silty substratum also exposed and difficult to vegetate; susceptible to siltation in channels.
Natural drainage is adequate.	Slope is mainly 2 to 12 percent, but is more than 12 percent in places; moderate to slow intake rate; highly susceptible to water erosion.	Slope is mainly 2 to 12 percent, but is more than 12 percent in places; silty clay loam exposed by deep cuts; susceptible to siltation in channels.	Highly erodible; slope is more than 12 percent in places; silty clay loam subsoil exposed by deep cuts; susceptible to siltation in channels.
Natural drainage is adequate.	Very low available water capacity; slope is more than 7 percent; sand and gravel rapidly permeable.	Sand and gravel rapidly permeable and little runoff; droughty; very difficult to vegetate; very low available water capacity; slopes are very short and more than 7 percent.	Sand and gravel; very low available water capacity; droughty; very difficult to vegetate.
Natural drainage is adequate.	Slope is mainly 12 to 30 percent, but is 60 percent in places; moderate to slow intake rate; highly susceptible to water erosion.	Slope is mainly 12 to 30 percent, but is 60 percent in places.	Highly erodible; slope is mainly 12 to 30 percent, but is 60 in places; clay loam subsoil and gravel and cobblestones exposed by cuts; difficult to vegetate.

TABLE 10.—*Engineering interpretations*

Soil series and map symbols	Soil features affecting—		
	Winter grading	Pond reservoir areas	Embankments, dikes, and levees
High Gap Mapped only with Hickory soils.	Surface layer and upper part of subsoil freeze hard; difficult to excavate frozen soil and compact material; slope is 12 to 60 percent.	Slope is 12 to 60 percent	Subsoil: medium to low shear strength; medium compressibility; low to medium susceptibility to piping; fair to good compaction characteristics; moderate shrink-swell potential. Underlying material: medium to low shear strength; high compressibility; fair to poor compaction characteristics; high shrink-swell potential; poor workability.
Hitt variant: V506A	Surface layer and upper part of subsoil freeze hard; difficult to excavate frozen soil and compact material.	Limestone bedrock at a depth of 20 to 40 inches; high seepage potential; slope is 0 to 4 percent.	Subsoil: limited volume of material; medium to low shear strength; low to medium compressibility; medium susceptibility to piping; fair to good compaction characteristics; moderate shrink-swell potential. Underlying material: limestone bedrock at a depth of 20 to 40 inches.
Hoopeston: 172	Susceptible to freezing, depending on moisture content; somewhat poorly drained.	Rapidly permeable; high seepage potential; seasonal high water table at a depth of 12 to 36 inches; nearly level.	Sandy; medium shear strength; low to medium compressibility; low to medium permeability after compaction; medium susceptibility to piping; fair compaction characteristics.
Joslin: 763A, 763B	Surface layer and upper part of subsoil freeze hard; difficult to excavate frozen soil and compact material.	Moderate seepage potential below silty clay layer; slope is 0 to 6 percent.	Upper silty part of subsoil: medium to low shear strength; medium compressibility; medium to high susceptibility to piping; fair compaction characteristics; medium to low permeability after compaction. Lower, clayey part of subsoil: medium to low shear strength; high compressibility; fair to poor compaction characteristics; high shrink-swell potential.
Joy: 275	Surface layer and upper part of subsoil freeze hard; difficult to excavate frozen soil and compact material; somewhat poorly drained.	Seasonal high water table at a depth of 12 to 36 inches; moderate seepage potential; nearly level; high organic-matter content in surface layer.	Medium to low shear strength; medium to high compressibility; medium to high susceptibility to piping; fair compaction characteristics; medium to low permeability after compaction; high organic-matter content in surface layer.
*Lamont: 947C2, 947F2 For Tell part of 947C2 and 947F2, see Tell series. For Bloomfield part of 947C2 and 974F2, see Bloomfield series.	Susceptible to freezing, depending on moisture content; slope is 30 percent in places.	Rapidly permeable; high seepage potential; slope is 4 to 30 percent.	Fine sandy loam layer; medium shear strength; low to medium compressibility; medium to low permeability after compaction; high susceptibility to piping; fair compaction characteristics. Underlying material: highly permeable after compaction.
Landes: 304	Susceptible to freezing, depending on moisture content.	Rapidly permeable; high seepage potential; slope is 0 to 4 percent; subject to flooding.	Medium shear strength; low to medium compressibility; medium to high permeability after compaction; medium to high susceptibility to piping; good compaction characteristics.
Lawler: 647	Surface layer and upper part of subsoil freeze hard; difficult to excavate frozen soil and compact material; somewhat poorly drained.	Underlying material rapidly permeable; rapid seepage rate; seasonal high water table at a depth of 12 to 36 inches; nearly level.	Subsoil: limited material; medium to low shear strength; medium compressibility; low permeability after compaction; medium to low susceptibility to piping; fair compaction characteristics; moderate shrink-swell potential. Underlying material: rapidly permeable after compaction.

for specified uses—Continued

Soil features affecting—Continued			
Drainage for crops and pasture	Irrigation	Terraces and diversions	Grassed waterways
Natural drainage is adequate.	Silty clay shale at a depth of 20 to 40 inches; slope is 12 to 60 percent; moderate intake rate.	Slope is 12 to 60 percent	Highly erodible; slope is 12 to 60 percent; clay loam subsoil or clayey shale underlying material exposed by cuts; difficult to vegetate shaley material; seepy in places.
Natural drainage is adequate.	Moderate available water capacity; limestone bedrock at a depth of 20 to 40 inches; moderate intake rate.	Subsoil or underlying limestone bedrock exposed by cuts; difficult to vegetate.	Subsoil or underlying limestone bedrock exposed by cuts; moderate available water capacity; difficult to vegetate.
Sandy; seasonal high water table at a depth of 12 to 36 inches; unstable ditchbanks.	Low available water capacity; seasonal high water table at a depth of 12 to 36 inches.	Not needed; nearly level	Not needed; nearly level.
Natural drainage is adequate.	Slope is 0 to 7 percent; moderate intake rate; moderately slowly permeable underlying silty clay.	Deep cuts expose silty clay between depths of 40 and 60 inches; silty clay layer is difficult to work and vegetate.	Deep cuts expose silty clay between depths of 40 and 60 inches; silty clay layer is difficult to work and vegetate.
Seasonal high water table at a depth of 12 to 36 inches.	Moderate intake rate; seasonal high water table at a depth of 12 to 36 inches.	Not needed; nearly level	Not needed; nearly level.
Natural drainage is adequate.	Low to moderate available water capacity; slope is 4 to 30 percent; susceptible to soil blowing.	Rapidly permeable; fine sandy loam and little runoff; loose sand exposed by cuts; slope is 30 percent in places; susceptible to soil blowing; droughty; difficult to vegetate; low to moderate available water capacity.	Sandy; subject to accumulation of windblown material; slope is 4 to 30 percent; low to moderate available water capacity; droughty; difficult to vegetate.
Natural drainage is adequate, but subject to flooding.	Moderate to low available water capacity; subject to flooding; susceptible to soil blowing.	Not needed: porous sand; nearly level to gently sloping bottom land.	Not needed: porous sand; nearly level to gently sloping bottom land.
Seasonal high water table at a depth of 12 to 36 inches; sand and gravel at a depth of 20 to 40 inches; unstable ditchbanks.	Moderate available water capacity; seasonal high water table at a depth of 12 to 36 inches.	Not needed; nearly level	Not needed; nearly level.

TABLE 10.—*Engineering interpretations*

Soil series and map symbols	Soil features affecting—		
	Winter grading	Pond reservoir areas	Embankments, dikes, and levees
Lawson: 451	Upper 2 to 3 feet freezes hard; difficult to excavate frozen soil and compact material; somewhat poorly drained.	Moderate seepage potential; seasonal high water table at a depth of 12 to 36 inches; nearly level bottom land; subject to flooding.	Medium to low shear strength; medium to high compressibility; medium to low permeability after compaction; medium to high susceptibility to piping; fair compaction characteristics.
Marsh: 718. Severe limitations for all uses; normal high water table.			
Martinsville: 570B, 570D3, and 570E3.	Surface layer and upper part of subsoil freeze hard; difficult to excavate frozen soil and compact material; slope is 18 percent in places.	Slope is 2 to 18 percent; susceptibility to seepage in underlying material in places.	Subsoil: medium to low shear strength; medium compressibility; low to medium susceptibility to piping; fair to good compaction characteristics; moderate shrink-swell potential; some gravel. Underlying material: medium to low compressibility; medium permeability after compaction; medium susceptibility to piping; fair compaction characteristics; gravel.
Millington: 82, W82	Upper 2 to 3 feet freezes hard; difficult to excavate frozen soil and compact material; poorly drained.	Seasonal high water table at a depth of less than 12 inches; nearly level bottom lands; high organic-matter content in upper 2 to 3 feet; subject to flooding; susceptibility to seepage in underlying material.	Silt loam: medium to low shear strength; medium to high compressibility; medium to low permeability after compaction; medium to high susceptibility to piping; fair compaction characteristics; high organic-matter content in upper 2 to 3 feet. Underlying material: highly pervious; difficult to vegetate.
Millsdale: 317	Surface layer and upper part of subsoil freeze hard; difficult to excavate frozen soil and compact material; poorly drained.	Seasonal high water table at a depth of less than 12 inches; limestone bedrock at a depth of 20 to 40 inches; nearly level; high organic-matter content in surface layer.	Subsoil: limited material; medium to low shear strength; high compressibility; fair to poor compaction characteristics; high shrink-swell potential. Underlying material: limestone bedrock.
Mixed alluvial land: 455. No interpretations. Too variable to rate. Onsite determination is necessary.			
Montgomery: 465	Surface layer and upper part of subsoil freeze hard; difficult to excavate frozen soil and compact material; very poorly drained.	Seasonal high water table at a depth of less than 12 inches; nearly level; high organic-matter content in surface layer.	Subsoil: medium to low shear strength; high compressibility; fair to poor compaction characteristics; poor workability; high shrink-swell potential. Underlying material: medium to low shear strength; medium compressibility; low to medium susceptibility to piping; fair to good compaction characteristics; moderate shrink-swell potential.
Muscatine: 41	Surface layer and upper part of subsoil freeze hard; difficult to excavate frozen soil and compact material; somewhat poorly drained.	Seasonal high water table at a depth of 12 to 36 inches; nearly level; high organic-matter content in surface layer.	Subsoil: medium to low shear strength; medium compressibility; low to medium susceptibility to piping; fair to good compaction characteristics; moderate shrink-swell potential. Underlying material: medium to low shear strength; medium compressibility; medium to high susceptibility to piping; fair compaction characteristics; moderate shrink-swell potential.

for specified uses—Continued

Soil features affecting—Continued			
Drainage for crops and pasture	Irrigation	Terraces and diversions	Grassed waterways
Seasonal high water table at a depth of 12 to 36 inches; subject to flooding.	Moderate intake rate; seasonal high water table at a depth of 12 to 36 inches; subject to flooding.	Not needed; nearly level bottom land.	Not needed: nearly level bottom land.
Natural drainage is adequate.	Slope is 2 to 18 percent; moderate intake rate.	Slope is 2 to 18 percent; clay loam subsoil and some gravel exposed by cuts; difficult to vegetate.	Highly erodible; slope is 2 to 18 percent; clay loam subsoil and gravel exposed by cuts; difficult to vegetate.
Seasonal high water table at a depth of less than 12 inches; subject to flooding; surface ponding.	Moderate intake rate; seasonal high water table at a depth of less than 12 inches; subject to flooding.	Not needed; nearly level bottom land.	Not needed; nearly level bottom land.
Slowly to moderately permeable; limestone bedrock at a depth of 20 to 40 inches; seasonal high water table at a depth of less than 12 inches.	Moderate available water capacity; limestone bedrock at a depth of 20 to 40 inches; moderate to slow intake rate; seasonal high water table at a depth of less than 12 inches; slowly to very slowly permeable.	Not needed; nearly level	Not needed; nearly level.
Slowly to very slowly permeable; seasonal high water table at a depth of less than 12 inches.	Slow to moderate intake rate; seasonal high water table at a depth of less than 12 inches; slowly to very slowly permeable subsoil.	Not needed; nearly level	Not needed; nearly level.
Seasonal high water table at a depth of 12 to 36 inches.	Moderate intake rate; seasonal high water table at a depth of 12 to 36 inches.	Not needed; nearly level	Not needed; nearly level.

TABLE 10.—*Engineering interpretations*

Soil series and map symbols	Soil features affecting—		
	Winter grading	Pond reservoir areas	Embankments, dikes, and levees
Niota: 261	Surface layer and upper part of subsoil freeze hard; difficult to excavate frozen soil and compact material; poorly drained.	Seasonal high water table at a depth of less than 12 inches; nearly level.	Subsoil: medium to low shear strength; high to medium compressibility; fair compaction characteristics; high shrink-swell potential. Underlying material: medium to low shear strength; medium compressibility; medium to high susceptibility to piping; fair compaction characteristics.
Oakville: 741C, 741F	Susceptible to freezing, depending on moisture content; slope is 2 to 60 percent.	Rapidly permeable; high seepage potential; slope is 60 percent in places.	Sandy; highly pervious; droughty; difficult to vegetate.
Orion: 415	Upper 2 to 3 feet freezes hard; difficult to excavate frozen soil and compact material; somewhat poorly drained.	Moderate seepage potential; seasonal high water table at a depth of 12 to 36 inches; nearly level bottom lands; subject to flooding.	Medium to low shear strength; medium compressibility; medium to low permeability after compaction; medium to high susceptibility to piping; fair compaction characteristics.
Otter: 76, W76	Upper 2 to 3 feet freezes hard; difficult to excavate frozen soil and compact material; poorly drained.	Seasonal high water table at a depth of less than 12 inches; nearly level bottom lands; high organic-matter content in upper 2 to 3 feet; subject to flooding; susceptible to seepage.	Medium to low shear strength; medium compressibility; medium to low permeability after compaction; medium to high susceptibility to piping; fair compaction characteristics; high organic-matter content in upper 2 to 3 feet.
Port Byron: 277A, 277B	Surface layer and upper part of subsoil freeze hard; difficult to excavate frozen soil and compact material.	Moderate seepage potential; slope is 0 to 6 percent; moderate organic-matter content in surface layer.	Medium to low shear strength; medium to low permeability after compaction; medium to high susceptibility to piping; fair compaction characteristics; moderate organic-matter content in surface layer.
Quarry: Qu. No interpretations.			
Raddle: 430A, 430B	Surface layer and upper part of subsoil freeze hard; difficult to excavate frozen soil and compact material.	Moderate seepage potential; slope is 0 to 6 percent.	Medium to low shear strength; low to medium compressibility; medium to low permeability after compaction; medium to high susceptibility to piping; fair compaction characteristics.
Radford: 74	Upper 2 to 3 feet freezes hard; difficult to excavate frozen soil and compact material; somewhat poorly drained.	Seasonal high water table at a depth of 12 to 36 inches; nearly level bottom land; subject to flooding.	Silt loam: medium to low shear strength; medium compressibility; medium to low permeability after compaction; medium to high susceptibility to piping; fair compaction characteristics. Underlying material: medium to low shear strength; medium compressibility; low to medium susceptibility to piping; fair compaction characteristics; moderate shrink-swell potential.
Rozetta: 279	Surface layer and upper part of subsoil freeze hard; difficult to excavate frozen soil and compact material.	Seasonal high water table at a depth of 36 to 60 inches; nearly level.	Subsoil: medium to low shear strength; medium compressibility; low to medium susceptibility to piping; fair compaction characteristics; moderate shrink-swell potential. Underlying material: medium to low shear strength; medium compressibility; medium to low permeability after compaction; medium to high susceptibility to piping; fair compaction characteristics.

for specified uses—Continued

Soil features affecting—Continued			
Drainage for crops and pasture	Irrigation	Terraces and diversions	Grassed waterways
Slowly permeable; seasonal high water table at a depth of less than 12 inches.	Slow intake rate; seasonal high water table at a depth of less than 12 inches; subsoil slowly permeable.	Not needed; nearly level	Not needed; nearly level.
Natural drainage is adequate.	Very low to low available water capacity; slope is 2 to 60 percent; very rapidly permeable; susceptible to soil blowing.	Rapidly permeable fine sand; little runoff; slope is 60 percent in places; susceptible to soil blowing; difficult to vegetate; very low to low available water capacity.	Sandy; accumulation of wind-blown material; very low to low available water capacity; slope is 60 percent in places; droughty; very difficult to vegetate.
Seasonal high water table at a depth of 12 to 36 inches; subject to flooding.	Moderate intake rate; seasonal high water table at a depth of 12 to 36 inches; subject to flooding.	Not needed; nearly level bottom land.	Not needed; nearly level bottom land.
Seasonal high water table at a depth of less than 12 inches; subject to flooding.	Moderate intake rate; seasonal high water table at a depth of less than 12 inches; subject to flooding.	Not needed; nearly level bottom land.	Not needed; nearly level bottom land.
Natural drainage is adequate.	Slope is 0 to 6 percent; moderate intake rate; susceptible to water erosion on slopes.	Susceptible to siltation in channels.	Susceptible to water erosion on slopes; subject to siltation in channels.
Natural drainage is adequate.	Slope is 0 to 6 percent; moderate intake rate; susceptible to water erosion.	Susceptible to siltation in channels.	Susceptible to water erosion; subject to siltation in channels.
Seasonal high water table at a depth of 12 to 36 inches; subject to flooding.	Moderate intake rate; seasonal high water table at a depth of 12 to 36 inches; subject to flooding.	Not needed; nearly level bottom land.	Not needed; nearly level bottom land.
Natural drainage is adequate.	Moderate intake rate	Not needed in most places; nearly level.	Not needed in most places; nearly level.

TABLE 10.—*Engineering interpretations*

Soil series and map symbols	Soil features affecting—		
	Winter grading	Pond reservoir areas	Embankments, dikes, and levees
Sable: 68	Surface layer and upper part of subsoil freeze hard; difficult to excavate frozen soil and compact material; poorly drained.	Seasonal high water table at a depth of less than 12 inches; nearly level; high organic-matter content in surface layer.	Subsoil: medium to low shear strength; medium to high compressibility; low to medium susceptibility to piping; fair compaction characteristics; high shrink-swell potential. Underlying material: medium to low shear strength; medium compressibility; medium to high susceptibility to piping; fair compaction characteristics.
Saude: 774	Susceptible to freezing, depending on moisture content.	Rapidly permeable; high seepage potential.	Loam: limited material; medium shear strength; low to medium compressibility; medium to low permeability after compaction; high susceptibility to piping; fair compaction characteristics. Underlying material: high permeability after compaction.
Sawmill: 107, W107	Upper 2 to 3 feet freezes hard; difficult to excavate frozen soil and compact material; poorly drained.	Seasonal high water table at a depth of less than 12 inches; nearly level bottom lands; high organic-matter content in upper 2 to 3 feet; subject to flooding.	Medium to low shear strength; medium to high compressibility; fair compaction characteristics; high shrink-swell potential; high organic-matter content in upper 2 to 3 feet.
*Seaton: 274B, 274C2, 274D2, 274E2, 942D2, 942E2, 942F2, 943D2, 943E2, 943F2. For Oakville part of 942D2, 942E2, and 942F2, see Oakville series. For Timula part of 943D2, 943E2, and 943F2, see Timula series.	Surface layer and upper part of subsoil freeze hard; difficult to excavate frozen soil and compact material; slope is 30 percent in places.	Moderate seepage potential; slope is mainly 2 to 18 percent, but is 30 percent in places.	Medium to low shear strength; medium compressibility; medium to low permeability after compaction; medium to high susceptibility to piping; fair compaction characteristics.
Seaton sandy substratum: 563B.	Surface layer and upper part of subsoil freeze hard; difficult to excavate frozen soil and compact material.	Underlying material rapidly permeable; rapid seepage rate.	Subsoil: limited volume; medium to low shear strength; medium compressibility; medium to low permeability after compaction; medium to high susceptibility to piping; fair compaction characteristics. Underlying material: highly permeable after compaction.
Sparta: 88B	Susceptible to some freezing, depending on moisture content.	Rapidly permeable; high seepage potential.	Sandy; highly pervious; droughty; difficult to vegetate.
*Strawn: 959G For Chute part, see Chute series.	Surface layer and subsoil freeze hard; difficult to excavate frozen soil and compact material; slope is more than 25 percent.	Moderate seepage potential; slope is more than 25 percent.	Subsoil: limited volume; medium to low shear strength; medium compressibility; low to medium susceptibility to piping; fair to good compaction characteristics; moderate shrink-swell potential. Underlying material: medium to low shear strength; medium compressibility; medium to low permeability after compaction; medium to high susceptibility to piping; fair compaction characteristics.

for specified uses—Continued

Soil features affecting—Continued			
Drainage for crops and pasture	Irrigation	Terraces and diversions	Grassed waterways
Seasonal high water table at a depth of less than 12 inches.	Moderate intake rate; seasonal high water table at a depth of less than 12 inches.	Not needed; nearly level	Not needed; nearly level.
Natural drainage is adequate.	Moderate available water capacity; moderate intake rate; subsoil moderately rapidly permeable; sand and gravel underlying material.	Not needed; nearly level	Not needed; nearly level.
Seasonal high water table at a depth of less than 12 inches; subject to flooding; surface ponding in places.	Moderate intake rate; seasonal high water table at a depth of less than 12 inches; subject to flooding; surface ponding in places.	Not needed; nearly level bottom land.	Not needed; nearly level bottom land.
Natural drainage is adequate.	Slope is mainly 2 to 18 percent, but is 30 percent in places; moderate intake rate; susceptible to water erosion.	Slope is mainly 2 to 18 percent, but is 30 percent in places; susceptible to channel siltation.	Highly erodible; slope is 30 percent in places; susceptible to channel siltation.
Natural drainage is adequate.	Slope is 2 to 7 percent; moderate intake rate; susceptible to water erosion.	Susceptible to siltation in channels.	Susceptible to water erosion; subject to siltation in channels.
Natural drainage is adequate.	Very low available water capacity; very rapidly permeable; susceptible to soil blowing; slope is 0 to 6 percent.	Sand rapidly permeable; little runoff; susceptible to soil blowing; droughty; very difficult to vegetate; very low available water capacity.	Sandy material; accumulation of wind blown material; very low available water capacity; droughty; very difficult to vegetate.
Natural drainage is adequate.	Moderate to high available water capacity; slope is more than 25 percent; moderate intake rate; high susceptibility to water erosion.	Slope is more than 25 percent.	Highly erodible; slope is more than 25 percent; stones and boulders exposed by cuts; difficult to vegetate.

TABLE 10.—*Engineering interpretations*

Soil series and map symbols	Soil features affecting—		
	Winter grading	Pond reservoir areas	Embankments, dikes, and levees
Stronghurst: 278	Surface layer and upper part of subsoil freeze hard; difficult to excavate frozen soil and compact material; somewhat poorly drained.	Seasonal high water table at a depth of 12 to 36 inches; nearly level.	Subsoil: medium to low shear strength; medium to high compressibility; fair compaction characteristics; moderate to high shrink-swell potential. Underlying material: medium to low shear strength; medium compressibility; medium to low permeability after compaction; medium to high susceptibility to piping; fair compaction characteristics.
*Sylvan: 19D3, 19E, 19E3, 19F, 19F3, 962F. For Bold part of 962F, see Bold series.	Surface layer and subsoil freeze hard; difficult to excavate frozen soil and compact material; slope is mainly 7 to 30 percent, but is more than 30 percent in places.	Moderate seepage potential in underlying material; slope is mainly 7 to 30 percent, but is more than 30 percent in places.	Subsoil: medium to low shear strength; medium compressibility; low to medium susceptibility to piping; fair to good compaction characteristics; moderate shrink-swell potential. Underlying material: medium to low shear strength; medium compressibility; medium to low permeability after compaction; medium to high susceptibility to piping; fair compaction characteristics.
Tama: 36A, 36B, 36C2, 36D2.	Surface layer and subsoil freeze hard; difficult to excavate frozen soil and compact material.	Slope is 0 to 12 percent; high organic-matter content in uneroded surface layer.	Subsoil: medium to low shear strength; medium compressibility; low to medium susceptibility to piping; fair to good compaction characteristics; moderate to high shrink-swell potential. Underlying material: medium to low shear strength; medium compressibility; medium to high susceptibility to piping; fair compaction characteristics; medium to low permeability after compaction.
Tell Mapped only with Lamont and Bloomfield soils.	Susceptible to freezing, depending on moisture content; slope is 30 percent in places.	Underlying material rapidly permeable; rapid seepage rate; slope is 4 to 30 percent.	Silt loam: medium to low shear strength; medium compressibility; medium to low permeability after compaction; high susceptibility to piping; fair to poor compaction characteristics. Underlying material: highly permeable after compaction.
Timula Mapped only with Seaton soils.	Surface layer and subsoil freeze hard; difficult to excavate frozen soil and compact material; slope is 7 to 30 percent.	High seepage potential; slope is 7 to 30 percent.	Medium to low shear strength; medium compressibility; medium permeability after compaction; highly susceptible to piping; fair to poor compaction characteristics.
Trempealeau: 765A	Susceptible to freezing, depending on moisture content.	Substratum rapidly permeable; high seepage potential.	Subsoil: limited material; medium to low shear strength and compressibility; medium to low susceptibility to piping; good to fair compaction characteristics; moderate shrink-swell potential. Underlying material: highly permeable after compaction.

for specified uses—Continued

Soil features affecting—Continued			
Drainage for crops and pasture	Irrigation	Terraces and diversions	Grassed waterways
Moderately to moderately slowly permeable; seasonal high water table at a depth of 12 to 36 inches.	Moderate intake rate; seasonal high water table at a depth of 12 to 36 inches; moderately to moderately slowly permeable.	Not needed; nearly level	Not needed; nearly level.
Natural drainage is adequate.	Slope is mainly 7 to 30 percent, but is more than 30 percent in places; moderate to slow intake rate; high susceptibility to water erosion.	Slope is mainly 7 to 30 percent, but is more than 30 percent in places; silty clay loam subsoil is exposed by cuts; highly erodible silty substratum is also exposed in many cuts and is difficult to vegetate; susceptible to siltation in channels.	Highly erodible; slope is mainly 7 to 30 percent, but is more than 30 percent in places; silty clay loam subsoil is exposed by cuts; highly erodible silty substratum is also exposed in many cuts and is difficult to vegetate; susceptible to siltation in channels.
Natural drainage is adequate.	Slope is 0 to 12 percent; moderate intake rate; high susceptibility to water erosion on slopes.	Susceptible to siltation in channels.	Susceptible to water erosion on slopes and siltation in channels.
Natural drainage is adequate.	Moderate available water capacity; slope is 4 to 30 percent; moderate intake rate; high susceptibility to water erosion.	Slope is 4 to 30 percent; susceptible to siltation in channels; loose sand exposed by deep cuts; cuts droughty and difficult to vegetate; moderate available water capacity.	Highly erodible; slope is 4 to 30 percent; moderate available water capacity; susceptible to siltation in channels; loose sand exposed by deep cuts; cuts droughty and difficult to vegetate.
Natural drainage is adequate.	Slope is 7 to 30 percent; moderate intake rate; highly susceptible to water erosion.	Slope is 7 to 30 percent; susceptible to siltation in channels; cuts expose highly erodible silty substratum; vegetation is difficult to establish.	Highly erodible; slope is 7 to 30 percent; cuts expose highly erodible silty substratum; vegetation is difficult to establish; susceptible to siltation in channels.
Natural drainage is adequate.	Moderate available water capacity; moderate intake rate; subsoil moderately to moderately rapidly permeable; sandy substratum.	Rapidly permeable; little runoff; sandy material exposed by deep cuts; droughty; moderate available water capacity.	Surface layer and subsoil are less than 40 inches deep to underlying sand; moderate available water capacity; somewhat droughty.

TABLE 10.—*Engineering interpretations*

Soil series and map symbols	Soil features affecting—		
	Winter grading	Pond reservoir areas	Embankments, dikes, and levees
*Velma: 250E, 944E2 — For Coatsburg part of 944E2, see Coatsburg series.	Surface layer and upper part of subsoil freeze hard; difficult to excavate frozen soil and compact material; slope is 12 to 18 percent.	Slope is 12 to 18 percent	Subsoil: medium to low shear strength; medium compressibility; low to medium susceptibility to piping; fair to good compaction characteristics; moderate shrink-swell potential; some gravel. Underlying material: medium to low shear strength; medium compressibility; medium to high susceptibility to piping; fair compaction characteristics; gravel and cobblestones; medium to low permeability after compaction.
Wabash: 83	Upper 2 to 3 feet freezes hard; difficult to excavate frozen soil and compact material; very poorly drained.	Seasonal high water table at a depth of less than 12 inches; nearly level bottom land; high organic-matter content in upper 2 to 3 feet; subject to flooding.	Medium to low shear strength; high to medium compressibility; fair compaction characteristics; high organic-matter content in upper 2 to 3 feet.
Waukee: 727A	Susceptible to freezing, depending on moisture content.	Substratum rapidly permeable; high seepage potential.	Subsoil: limited material; medium to low shear strength; medium compressibility; medium to low permeability after compaction; medium to high susceptibility to piping; fair compaction characteristics. Underlying material: highly permeable after compaction.

for specified uses—Continued

Soil features affecting—Continued			
Drainage for crops and pasture	Irrigation	Terraces and diversions	Grassed waterways
Natural drainage is adequate_	Slope is 12 to 18 percent; moderate intake rate; high susceptibility to water erosion.	Slope is 12 to 18 percent ____	Highly erodible; slope is 12 to 18 percent; clay loam subsoil, gravel, and cobblestones are exposed by cuts; difficult to vegetate.
Very slowly permeable; seasonal high water table at a depth of less than 12 inches; subject to flooding.	Slow to moderate intake rate; seasonal high water table at depth of less than 12 inches; subsoil very slowly permeable; subject to flooding.	Not needed; nearly level bottom land.	Not needed; nearly level bottom land.
Natural drainage is adequate_	Moderate available water capacity; moderate intake rate; substratum rapidly permeable.	Rapidly permeable; little runoff; sandy material is exposed by deep cuts; droughty; moderate available water capacity.	Surface layer and subsoil are less than 40 inches to underlying sand; moderate available water capacity; somewhat droughty.

TABLE 11.—

[Tests performed by Illinois Department of

Soil name and location	Parent material	Report 72-IL-081	Depth	Moisture density[1]		Mechanical analysis[2]	
				Maximum dry density	Optimum moisture	Percentage passing sieve—	
						¾ in	⅜ in
			Inches	*Lb per cu ft*	*Percent*		
Atlas silt loam:	Loess over relic gleyed paleosol.	1–1	0–5	102	19	-----	-----
240 feet north and 35 feet east of southwest corner sec. 33, T. 16 N., R. 2 W. (modal)		1–2	20–25	103	19	-----	-----
		1–3	35–46	108	16	-----	-----
Coatsburg silt loam:	Loess over gleyed Sangamon paleosol; oxidized Illinoian till.	2–1	0–6	97	21	-----	-----
481 feet north of gate center and 53 feet east in the northwest corner of NW¼SE¼SE¼ sec. 34, T. 16 N., R. 3 W. (modal)		2–2	18–30	100	19	-----	100
		2–3	54–72	115	15	-----	100
Denny silt loam:	Loess.	3–1	0–9	98	21	-----	-----
171 feet north of west corner of east-west fence, and 128 feet east of road fence in the southwest corner of SW¼SW¼ NW¼ sec. 20, T. 16 N., R. 2 W. (nonmodal—does not have abrupt textural change between the A2 and B21tg horizons.)		3–2	9–14	106	18	-----	-----
		3–3	25–44	99	21	-----	-----
		3–4	58–61	110	16	-----	-----
Hickory silt loam:	Loess over glacial till.	4–1	3–7	113	14	-----	-----
138 feet north of center of old lane; 70 feet west of centerline of Illinois Route No. 92 in SE¼ NE¼SW¼ sec. 35, T. 17 N., R. 4 W. (modal)		4–2	23–27	106	18	-----	100
		4–3	48–58	123	12	[4] 98	97
High Gap silt loam:	Illinoian till over Pennsylvanian clay shale.	5–1	4–7	116	16	100	99
100 feet north along Illinois Route No. 92 at crest of west road bank, from center of gate to BSA property in the southeast corner of SE¼NE¼ SW¼ sec. 35, T. 17 N., R. 4 W. (modal)		5–2	21–28	111	16	[5] 99	99
		5–3	37–55	110	18	-----	-----
Montgomery silty clay loam:	Lacustrine sediments.	6–1	0–8	89	25	-----	-----
175 feet south of east-west fence line and 23 feet east of north-south fence in the northwest corner of the NW¼NW¼ sec. 29, T. 17 N., R. 2 W. (nonmodal—B horizon below depth of 40 inches formed by red clay sediments.)		6–2	34–46	102	22	-----	-----
		6–3	56–64	87	31	-----	-----
		6–4	64–74	116	17	-----	-----
Niota silt loam:	Loess with lacustrine material underneath.	7–1	7–14	105	20	-----	-----
43 feet southwest along centerline of road from a point in line with center of field gate and 143 feet northwest and perpendicular to centerline of Illinois Highway 2 in the northwest corner of the SW¼SE¼SW¼ sec. 30, T. 19 N., R. 3 E. (modal)		7–2	14–24	89	31	-----	-----
		7–3	24–33	101	20	-----	-----
		7–4	53–60	105	20	-----	-----

Engineering test data

Transportation, Bureau of Materials, Springfield]

Mechanical analysis[2]—Continued								Liquid limit	Plasticity index	Classification	
Percentage passing sieve—Continued				Percentage smaller than—							
No. 4 (4.7 mm)	No. 10 (2.0 mm)	No. 40 (0.42 mm)	No. 200 (0.074 mm)	0.05 mm	0.02 mm	0.005 mm	0.002 mm			AASHO[3]	Unified
								Percent			
-----	100	99	95	94	71	30	19	40	18	A-6(18)	CL
----	100	96	79	78	69	40	33	47	30	A-7-6(23)	CL
-----	100	96	78	78	68	45	39	44	27	A-7-6(21)	CL
-----	100	99	94	89	71	34	24	45	19	A-7-6(21)	CL
99	99	95	78	74	66	54	46	53	35	A-7-6(27)	CH
99	98	93	71	66	53	35	31	39	23	A-6(15)	CL
-----	-----	100	99	92	67	36	22	38	13	A-6(15)	ML
-----	-----	-----	100	97	69	26	19	32	10	A-4(10)	CL
-----	-----	-----	100	88	63	36	26	52	31	A-7-6(35)	CH
-----	-----	-----	100	84	55	18	13	35	14	A-6(14)	CL
-----	100	99	93	91	71	28	24	30	10	A-4(9)	CL
99	98	92	57	54	50	48	46	49	29	A-7-6(6)	CL
96	94	88	57	55	52	30	26	30	16	A-6(7)	CL
98	97	93	74	68	54	19	14	21	2	A-4(0)	CL
98	97	91	66	66	62	47	41	44	28	A-7-6(16)	CL
-----	100	96	92	90	82	60	39	46	23	A-7-6(23)	CL
-----	100	99	96	92	78	46	33	61	32	A-7-6(37)	CH
-----	100	98	94	91	78	51	44	64	44	A-7-6(46)	CH
-----	100	100	98	97	94	86	72	88	57	A-7-5(67)	CH
-----	100	100	100	97	85	51	42	43	25	A-7-6(26)	CL
-----	100	98	95	91	82	46	33	35	12	A-6(12)	CL
-----	100	100	99	94	82	70	63	76	40	A-7-5(49)	OH
-----	100	100	99	93	90	39	33	50	23	A-7-6(27)	CH
-----	100	100	99	95	66	39	33	49	30	A-7-6(32)	CL

TABLE 11.—*Engineering*

[Tests performed by Illinois Department of

Soil name and location	Parent material	Report 72-IL-081	Depth	Moisture density[1]		Mechanical analysis[2]	
				Maximum dry density	Optimum moisture	Percentage passing sieve—	
						¾ in	⅜ in
			Inches	*Lb per cu ft*	*Percent*		
Otter silt loam:	Mississippi flood plain and bottom land.						
25 feet west and 270 feet south of gate in east-west fence in the southeast corner of NW¼SW¼ SW¼ sec. 31, T. 17 N., R. 5 W. (modal)		8–1	7–19	107	18	-----	-----
		8–2	31–40	111	18	-----	-----
Stronghurst silt loam:	Loess.						
160 feet south of road fence along east side of orchard lane, then 47 feet east in the southwest corner of SW¼SW¼NE¼ sec. 17, T. 18 N., R. 1 E. (modal)		9–1	0–10	106	17	-----	-----
		9–2	21–29	103	21	-----	-----
		9–3	51–60	110	17	-----	-----
Sylvan silt loam:	Loess.						
177 feet north of corner of east-west fence and northeast-southeast fence in the northeast corner of SW¼NW¼SE¼ sec. 29, T. 17 N., R. 2 W. (modal)		10–1	0–6	99	19	-----	-----
		10–2	6–15	108	17	-----	-----
		10–3	30–60	114	14	-----	-----
Velma silt loam:	Calcareous till.						
481 feet north of gate center and 26 feet east in the northwest corner of NW¼SE¼SE¼ sec. 34, T. 16 N., R. 3 W. (modal)		11–1	0–8	97	22	-----	-----
		11–2	22–33	112	16	[3] 99	99
		11–3	56–63	120	13	[4] 95	94
Wabash silty clay:	Mississippi sediments.						
65 feet north of culvert in drainage ditch and 97 feet west of ditch in southwest corner of NW¼SE¼SE¼ sec. 36, T. 16 N., R. 6 W. (modal)		12–1	0–6	82	29	-----	-----
		12–2	15–32	78	33	-----	-----
		12–3	40–63	82	31	-----	-----

[1] Based on AASHO Designation T 99, Method A(*1*).

[2] Mechanical analyses according to the AASHO Designation T 88. Results by this procedure frequently differ somewhat from results that would have been obtained by the soil survey procedure of the Soil Conservation Service (SCS). In the AASHO procedure, the fine material is analyzed by the hydrometer method and the various grain-size fractions are calculated on the basis of all the material, including that coarser than 2 millimeters in diameter. In the SCS soil survey procedure, the fine material is analyzed by the pipette method and the material coarser than 2 millimeters in diameter is excluded from calculations of grain-size fractions. The mechanical analyses used in this table are not suitable for use in naming textural classes for soil.

which the material passes from a plastic to a liquid. The plasticity index is the numerical difference between the liquid limit and the plastic limit. It indicates the range of moisture content within which soil material is in a plastic condition.

Formation and Classification of the Soils

This section consists of two main parts. The first part describes the factors of soil formation that have affected the development of soils in Rock Island County. The second explains the system of soil classification currently used and places each soil series in the classes of that system.

Factors of Soil Formation

The principal factors of soil formation are parent material, climate, plant and animal life, relief and drainage, and time. The relative importance of each factor differs from place to place, and each modifies the effect of the other four. In some cases one factor may dominate the formation of a soil. Man, in such activities as clearing forests and cultivating and for

test data—Continued

Transportation, Bureau of Materials, Springfield]

Mechanical analysis[3]—Continued								Liquid limit	Plasticity index	Classification	
Percentage passing sieve—Continued				Percentage smaller than—							
No. 4 (4.7 mm)	No. 10 (2.0 mm)	No. 40 (0.42 mm)	No. 200 (0.074 mm)	0.05 mm	0.02 mm	0.005 mm	0.002 mm			AASHO[5]	Unified
								Percent			
-----	100	100	72	68	64	46	40	43	23	A-7-6(15)	CL
-----	100	100	63	58	49	41	38	36	19	A-6(9)	CL
-----	100	99	95	89	49	12	5	32	9	A-4(9)	CL
-----	100	99	98	97	70	38	28	55	35	A-7-6(38)	CH
-----	100	100	88	78	53	28	21	37	17	A-6(15)	CL
-----	100	100	95	88	36	22	17	40	15	A-6(16)	CL
-----	100	100	95	92	40	28	24	38	19	A-6(19)	CL
-----	100	100	94	78	23	12	9	25	4	A-4(3)	CL–ML
-----	100	98	85	67	54	30	23	47	19	A-7-6(18)	ML
98	99	92	67	61	58	45	35	44	25	A-7-6(15)	CL
93	93	86	65	58	43	26	21	31	17	A-6(8)	CL
-----	100	100	97	93	90	67	52	73	38	A-7-5(46)	OH
-----	100	100	98	97	91	77	64	97	49	A-7-5(63)	OH
-----	100	98	94	93	90	75	59	90	43	A-7-5(53)	OH

[3] Based on AASHO Designation M 145 66–I(*1*).
[4] 98 percent passed the 1-inch sieve, and 100 percent passed the 1½-inch sieve.
[5] 100 percent passed the 1-inch sieve.
[6] 96 percent passed the 1- and 1½-inch sieve, 97 percent the 2-inch sieve, and 100 percent the 3-inch sieve.

tilizing fields, also changes the course of soil formation. So far man has had little effect on the overall development of soils in this survey area.

Parent material[8]

Peoria loess is the predominant parent material of the soils of Rock Island County (*12*). The Mississippi River Valley was the main loess source. The loess is about 30 feet thick on nearly level uplands. For example, the Muscatine and Rozetta soils formed in these thick loess deposits (*13*), whereas on slopes where the loess is thin or has been removed by erosion, the Hickory and High Gap soils formed in Illinoian glacial till or Pennsylvania shale, respectively.

Terrace or second-bottom soils are in the Mississippi and Rock River Valleys and in the larger creek valleys. On some of these terraces, Niota and Montgomery soils formed in fine-textured sediment. On other terraces, Sparta and Dickinson soils formed in sandy parent material.

[8] Detailed geologic information for Rock Island County can be found in the Geology Department at Augustana College in the city of Rock Island.

Medium and moderately fine textured soils formed in alluvium in the Mississippi and Rock River Valleys. Soils such as the Coffeen and Sawmill soils commonly occupy these river valleys. In the smaller valleys, soils formed mainly in recent medium-textured sediment washed from the uplands. For example, Dorchester, Radford, and Orion soils are in these small valleys.

Climate

Climate affects the formation of soils through its influence on the rate of weathering of parent material. The humid, temperate climate of the county contributes to the relatively rapid breakdown of soil minerals, to the formation of clay, and to the movement of these materials downward in the soil profile. Most of the upland soils of the county have considerably more clay in the subsoil than in the surface layer.

Plants and animals

Plants have had a greater effect than animals on the formation of soils in this county, but the animals and organisms that live on and in the soil also have been important. The changes they bring about depend mainly on the kind of life processes distinctive to each. The kinds of plants and animals that live on and in the soil are affected, in turn, by the climate, the parent material, relief, and the age of the soil.

Some soils in the county formed under trees, and others formed under prairie grasses. Most of the sloping soils formed mainly under such trees as oak and hickory. The nearly level soils formed under prairie grasses. They have a darker surface layer than those that formed under forest and are higher in organic-matter content.

Relief and drainage

Relief influences the amount of runoff, the degree of erosion, and the amount of water infiltrating and percolating through the soil profile. Where the soils formed in uniform, permeable parent material, such as loess, natural drainage is closely associated with slope. The moderately well drained and well drained soils are in the more rolling areas, and the somewhat poorly drained to very poorly drained soils are mainly on flats or in depressions. Slopes in the county range from less than 2 percent on bottom lands and nearly level uplands to more than 60 percent on the steeper parts of the uplands that border valleys.

Time

The length of time necessary for a soil to develop depends on the other factors of soil formation. Soils that formed in parent material low in lime develop more readily and become acid more readily than soils that formed in material high in lime. Permeable soils are leached of lime and other soluble minerals much faster than slowly permeable soils. Soils develop faster under forest than under prairie vegetation, because the grasses are more efficient in recycling calcium and other bases from the subsoil to the surface layer. Soils generally develop faster in humid climates than in dry climates. Because the soils have been exposed to weathering processes over a long period of time, they are usually more strongly developed or have greater horizon differentiation.

Most of the soils on uplands are moderately developed. The soils in the western and northern parts of the county and on terraces, however, are only weakly developed. Because there has not been enough time for changes to take place, most of the bottom-land soils have weak horizon differentiation or none at all.

Organic matter has accumulated in all the soils. Those that formed under prairie vegetation have a thicker, darker surface layer than those that formed under forest vegetation. In the poorly drained soils, iron compounds have been reduced and moved downward in the profile, causing the subsoil to become gray. Some of this iron has accumulated as concretions or small, round pellets. In the well-drained soils, the iron compounds are oxidized and are generally more diffuse. They make the subsoil brown to yellowish brown.

Classification of the Soils

The current system used to classify soils was adopted for general use by the National Cooperative Soil Survey in 1965 and supplemented in March 1967, September 1968, and December 1970 (*10*). This system is under continual study, and readers interested in the development of the system should refer to the latest literature available.

Table 12 shows the classification of each of the soil series represented in the county. Blown-out land, Clayey terrace escarpments, Gravelly terrace escarpments, Marsh, Mixed alluvial land, and Seaton sandy substratum are not classified. Some soils do not fit in a series that has been recognized in the classification system, but recognition of a separate series would not serve a useful purpose. Such soils are named for the series they strongly resemble because they differ from those series in ways too small to be of consequence in interpreting their use or management. Soil scientists designate such soils as taxadjuncts to the series for which they are named. In this survey soils in the Denny, High Gap, Landes, Montgomery, and Tell series are taxadjuncts to their series.

The classification system defines classes in terms of observable or measurable properties of soils. The properties chosen are chiefly those that permit the grouping of soils that are similar in genesis. The classification is designed to include all soils. It has six categories. Beginning with the most inclusive, they are the order, the suborder, the great group, the subgroup, the family, and the series. They are briefly defined in the following paragraphs.

ORDER.—Ten soil orders are recognized. They are Entisols, Vertisols, Inceptisols, Aridisols, Mollisols, Spodosols, Alfisols, Ultisols, Oxisols, and Histosols. The properties used to differentiate the soil orders are those that tend to give broad climatic groupings of soils. The two exceptions to this are the Entisols and Histosols, which occur in many different climates. The four orders represented in Rock Island County are Inceptisols, Mollisols, Alfisols, and Entisols.

Inceptisols generally develop on young, but not recent, land surfaces. Mollisols usually develop under

TABLE 12.—*Soils classified according to the current system of classification*

Soil series	Family	Subgroup	Order
Atlas	Fine, montmorillonitic, mesic, sloping	Aeric Ochraqualfs	Alfisols.
Atterberry	Fine-silty, mixed, mesic	Udollic Ochraqualfs	Alfisols.
Bloomfield	Coarse-loamy, mixed, mesic	Psammentic Hapludalfs	Alfisols.
Bold	Coarse-silty, mixed (calcareous), mesic	Typic Udorthents	Entisols.
Burkhardt	Sandy, mixed, mesic	Typic Hapludolls	Mollisols.
Calco	Fine-silty, mixed (calcareous), mesic	Cumulic Haplaquolls	Mollisols.
Canisteo	Fine-loamy, mixed (calcareous), mesic	Typic Haplaquolls	Mollisols.
Chute	Mixed, mesic	Typic Udipsamments	Entisols.
Coatsburg	Fine, montmorillonitic, mesic, sloping	Typic Argiaquolls	Mollisols.
Coffeen	Coarse-silty, mixed, mesic	Fluvaquentic Hapludolls	Mollisols.
Coyne	Coarse-loamy, mixed, mesic	Typic Argiudolls	Mollisols.
Denny[1]	Fine, montmorillonitic, mesic	Mollic Albaqualfs	Alfisols.
Dickinson	Coarse-loamy, mixed, mesic	Typic Hapludolls	Mollisols.
Dorchester	Fine-silty, mixed (calcareous), mesic	Typic Udifluvents	Entisols.
Downs	Fine-silty, mixed, mesic	Mollic Hapludalfs	Alfisols.
Elkhart	Fine-silty, mixed, mesic	Typic Argiudolls	Mollisols.
Fayette	Fine-silty, mixed, mesic	Typic Hapludalfs	Alfisols.
Hickory	Fine-loamy, mixed, mesic	Typic Hapludalfs	Alfisols.
High Gap[2]	Fine-loamy, mixed, mesic	Typic Hapludalfs	Alfisols.
Hitt variant	Fine-loamy, mixed, mesic	Typic Argiudolls	Mollisols.
Hoopeston	Coarse-loamy, mixed, mesic	Aquic Hapludolls	Mollisols.
Joslin	Fine-loamy, mixed, mesic	Typic Argiudolls	Mollisols.
Joy	Fine-silty, mixed, mesic	Aquic Hapludolls	Mollisols.
Lamont	Coarse-loamy, mixed, mesic	Typic Hapludalfs	Alfisols.
Landes[3]	Coarse-loamy, mixed, mesic	Fluventic Hapludolls	Mollisols.
Lawler	Fine-loamy over sandy or sandy skeletal, mixed, mesic	Aquic Hapludolls	Mollisols.
Lawson	Fine-silty, mixed, mesic	Cumulic Hapludolls	Mollisols.
Martinsville	Fine-loamy, mixed, mesic	Typic Hapludalfs	Alfisols.
Millington	Fine-loamy, mixed (calcareous), mesic	Cumulic Haplaquolls	Mollisols.
Millsdale	Fine, mixed, mesic	Typic Argiaquolls	Mollisols.
Montgomery[4]	Fine, mixed, mesic	Typic Haplaquolls	Mollisols.
Muscatine	Fine-silty, mixed, mesic	Aquic Hapludolls	Mollisols.
Niota	Fine, mixed, mesic	Mollic Albaqualfs	Alfisols.
Oakville	Mixed, mesic	Typic Udipsamments	Entisols.
Orion	Coarse-silty, mixed, nonacid, mesic	Aquic Udifluvents	Entisols.
Otter	Fine-silty, mixed, mesic	Cumulic Haplaquolls	Mollisols.
Port Byron	Fine-silty, mixed, mesic	Typic Hapludolls	Mollisols.
Raddle	Fine-silty, mixed, mesic	Typic Hapludolls	Mollisols.
Radford	Fine-silty, mixed, mesic	Fluventic Hapludolls	Mollisols.
Rozetta	Fine-silty, mixed, mesic	Typic Hapludalfs	Alfisols.
Sable	Fine-silty, mixed, mesic	Typic Haplaquolls	Mollisols.
Saude	Coarse-loamy over sandy or sandy skeletal, mixed, mesic	Typic Hapludolls	Mollisols.
Sawmill	Fine-silty, mixed, mesic	Cumulic Haplaquolls	Mollisols.
Seaton	Fine-silty, mixed, mesic	Typic Hapludalfs	Alfisols.
Sparta	Sandy, mixed, mesic	Entic Hapludolls	Mollisols.
Strawn	Fine-loamy, mixed, mesic	Typic Hapludalfs	Alfisols.
Stronghrust	Fine-silty, mixed, mesic	Aeric Ochraqualfs	Alfisols.
Sylvan	Fine-silty, mixed, mesic	Typic Hapludalfs	Alfisols.
Tama	Fine-silty, mixed, mesic	Typic Argiudolls	Mollisols.
Tell[5]	Fine-silty over sandy or sandy skeletal, mixed, mesic	Typic Hapludalfs	Alfisols.
Timula	Coarse-silty, mixed, mesic	Typic Eutrochrepts	Inceptisols.
Trempealeau	Fine-loamy over sandy or sandy skeletal, mixed, mesic	Typic Argiudolls	Mollisols.
Velma	Fine-loamy, mixed, mesic	Typic Argiudolls	Mollisols.
Wabash	Fine, montmorillonitic, mesic	Vertic Haplaquolls	Mollisols.
Waukee	Fine-loamy over sandy or sandy skeletal, mixed, mesic	Typic Hapludolls	Mollisols.

[1] Denny soils are taxadjuncts to the series because they lack an abrupt textural change.

[2] High Gap soils are taxadjuncts to the series because they have high pH in the lower part of the B horizon and the C horizon.

[3] Landes soils are taxadjuncts to the series because they are stratified in the horizon underlying the mollic epipedon.

[4] Montgomery soils are taxadjuncts to the series because the lower part of the B horizon formed in red clay sediments.

[5] Tell soils are taxadjuncts to the series because the sand content is high in the upper part of the profile.

grass vegetation. They have a thick, dark surface layer called the mollic epipedon. Alfisols are soils that have clay-enriched B horizons that are high in base saturation. Entisols are recent mineral soils that do not have genetic horizons or have only the beginnings of such horizons.

SUBORDER.—Each order is subdivided into suborders, primarily on the basis of characteristics that seem to produce classes having genetic similarity. The soil properties used to separate suborders are mainly those that reflect either the presence or absence of water-logging, or soil differences resulting from the climate or vegetation. The climatic range is narrower than that of the orders.

GREAT GROUP.—Soil suborders are separated into great groups on the basis of uniformity in the kinds and sequence of major soil horizons and other features. The horizons used as a basis for distinguishing be-

tween great groups are those in which clay, iron, or humus have accumulated or those that have pans that interfere with growth of roots or movement of water. The features used are the self-mulching properties of clay, soil temperature, chemical composition (mainly calcium, magnesium, sodium, and potassium), and the like.

SUBGROUP.—Great groups are subdivided into subgroups. One represents the central (typic) segment of the group and others, called intergrades, have properties of one great group and also have one or more properties of another great group, suborder, or order. Subgroups may also be made in instances where soil properties intergrade outside the range of any other great group, suborder, or order.

FAMILY.—Families are established within a subgroup primarily on the basis of properties that affect the growth of plants or behavior of soils when used for engineering. Among the properties considered are texture, mineralogy, reaction, soil temperature, permeability, thickness of horizons, and consistence.

SERIES.—The series is a group of soils that have major horizons that, except for texture of the surface layer, are similar in important characteristics and arrangement in the profile.

Literature Cited

(1) American Association of State Highway Officials. 1961. Standard specifications for highway materials and methods of sampling and testing. Ed. 8, 2 v., illus.

(2) Broadfoot, W. M. 1960. Field guide for evaluating cottonwood sites. U.S. Dept. Agr. South. Forest Expt. Sta., Occas. Paper 178, 6 pp., illus.

(3) Huff, F. A., and Changnon, S. A. 1959. Hail climatology of Illinois. Ill. State Water Survey, Rpt. of Invest. No. 38, 46 pp.

(4) Joos, L. A. 1960. Freeze probabilities in Illinois. Ill. Agr. Expt. Sta. in cooperation with U.S. Weather Bur., Bul. 650, 16 pp., illus.

(5) Leighton, M. M., and Brophy, J. A. 1961. Illinoian glaciation in Illinois. Jour. Geol. 69: 1–31, illus.

(6) Lemmon, Paul E. 1968. Grouping soils on the basis of woodland suitability. tree growth and forest soils. Proc. of the Third North Amer. Forest Soils Conf., pp. 413–426, Oregon State Univ. Press.

(7) Putman, J. A., Furnival, G. M., and McKnight, J. S. 1960. Management and inventory of southern hardwoods. U.S. Dept. Agr. Handbook 181, 110 pp., illus.

(8) Schnur, G. Luther. 1937. Yield, stand, and volume tables for even-aged upland oak forest. U.S. Dept. Agr. Tech. Bul. 560, 88 pp., illus. [Reprinted in 1961]

(9) United States Department of Agriculture. 1951. Soil survey manual. Agr. Handbook No. 18, 503 pp., illus.

(10) _____ 1960. Soil classification, a comprehensive system 7th approximation. 265 pp., illus. [Supplements issued in March 1967, September 1968, and December 1970]

(11) United States Department of Defense. 1968. Unified soil classification system for roads, airfields, embankments and foundations. MIL-STD-619B, 30 pp., illus.

(12) University of Illinois Agricultural Experiment Station. 1970. Productivity of Illinois soils. Cir. 1016, 17 pp.

(13) _____ 1971. Loess soils of northwest Illinois. Bul. 739, 112 pp.

(14) Wildlife Management Institute. 1963. Rating northeastern soils for their suitability for wildlife habitat. Trans. of the Twenty-Eighth North Amer. Wildlife and Nat. Resources Conf., pp. 247–261, illus.

Glossary

Acidity. See Reaction, soil.

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates, such as crumbs, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Alluvium. Soil material, such as sand, silt, or clay, that has been deposited on land by streams.

Association, soil. A group of soils geographically associated in a characteristic repeating pattern.

Available water capacity (also termed available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil.

Bottom land. Nearly level land on the bottom of a valley that has a stream flowing through it; subject to flooding and often referred to as a flood plain.

Calcareous soil. A soil containing enough calcium carbonate (often with magnesium carbonate) to effervesce (fizz) visibly when treated with cold, dilute hydrochloric acid.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are—

Loose.—Noncoherent when dry or moist; does not hold together in a mass.

Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

Sticky.—When wet, adheres to other material, and tends to stretch somewhat and pull apart, rather than to pull free from other material.

Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft.—When dry, breaks into powder or individual grains under very slight pressure.

Cemented.—Hard and brittle; little affected by moistening.

Contour farming. Plowing, planting, cultivating, and harvesting in rows that are at right angles to the natural direction of the slope or that are parallel to terrace grade.

Cover crops. Close-growing crops, grown primarily to improve and protect the soil between periods of regular crop production; or a crop grown between trees in orchards.

Drainage class (natural). Refers to the conditions of frequency and duration of periods of saturation or partial saturation that existed during the development of the soil, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven different classes of natural soil drainage are recognized.

Excessively drained soils are commonly very porous and rapidly permeable and have a low water-holding capacity.

Somewhat excessively drained soils are also very permeable and are free from mottling throughout their profile.

Well-drained soils are nearly free from mottling and are commonly of intermediate texture.

Moderately well drained soils commonly have a slowly permeable layer in or immediately beneath the solum. They have uniform color in the A and upper B horizons and mottling in the lower B and the C horizons.

Somewhat poorly drained soils are wet for significant periods but not all the time, and some soils commonly have mottling at a depth below 6 to 16 inches.

Poorly drained soils are wet for long periods and are light gray and generally mottled from the surface downward, although mottling may be absent or nearly so in some soils.

Very poorly drained soils are wet nearly all the time. They have a dark-gray or black surface layer and are gray or light gray, with or without mottling, in the deeper parts of the profile.

Diversion, or diversion terrace. A ridge of earth, generally a terrace, that is built to divert runoff from its natural course and, thus, to protect areas downslope from the effects of such runoff.

Erosion. The wearing away of the land surface by wind (sandblast), running water, and other geological agents.

Fertility, soil. The quality of a soil that enables it to provide compounds, in adequate amounts and in proper balance, for the growth of specific plants, when other growth factors such as light, moisture, temperature, and the physical condition of the soil are favorable.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, and covered by grass for protection against erosion; used to conduct surface water away from crop fields.

Horizon, soil. A layer of soil, approximately parallel to the surface, that has distinct characteristics produced by soil-forming processes. These are the major horizons:

O horizon.—The layer of organic matter on the surface of a mineral soil. This layer consists of decaying plant residues.

A horizon.—The mineral horizon at the surface or just below an O horizon. This horizon is the one in which living organisms are most active and therefore is marked by the accumulation of humus. The horizon may have lost one or more of soluble salts, clay, and sesquioxides (iron and aluminum oxides).

B horizon.—The mineral horizon below an A horizon. The B horizon is in part a layer of change from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics caused (1) by accumulation of clay, sesquioxides, humus, or some combination of these; (2) by prismatic or blocky structure; (3) by redder or stronger colors than the A horizon; or (4) by some combination of these. Combined A and B horizons are usually called the solum, or true soil. If a soil lacks a B horizon, the A horizon alone is the solum.

C horizon.—The weathered rock material immediately beneath the solum. In most soils this material is presumed to be like that from which the overlying horizons were formed. If the material is known to be different from that in the solum, a Roman numeral precedes the letter C.

R layer.—Consolidated rock beneath the soil. The rock usually underlies a C horizon but may be immediately beneath an A or B horizon.

Intake rate. The rate of entry of water into the soil, usually expressed in inches per hour. The rates apply to the upper 18 inches of soil where it is unsaturated and the surface covered by vegetation.

Rapid	Greater than 1.5 inches per hour
Moderate	1.0 to 1.5 inches per hour
Slow	Less than 1.0 inch per hour

Loess. Fine-grained material, dominantly of silt-sized particles, that has been deposited by wind.

Mottling, soil. Irregularly marked with spots of different colors that vary in number and size. Mottling in soils usually indicates poor aeration and lack of drainage. Descriptive terms are as follows: abundance—*few, common,* and *many;* size—*fine, medium,* and *coarse;* and contrast—*faint, distinct,* and *prominent.* The size measurements are these: *fine,* less than 5 millimeters (about 0.2 inch) in diameter along the greatest dimension; *medium,* ranging from 5 millimeters to 15 millimeters (about 0.2 to 0.6 inch) in diameter along the greatest dimension; and *coarse,* more than 15 millimeters (about 0.6 inch) in diameter along the greatest dimension.

Munsell notation. A system for designating color by degrees of the three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color with a hue of 10YR, a value of 6, and a chroma of 4.

Organic-matter content. Ratings used in this survey are as follows:

Low	Below 2 percent of volume
Moderate	2 to 4 percent
High	More than 4 percent

Percent slope. The slant or gradient of a slope stated in percent; for example, a slope of 10 percent is one that changes 10 feet in elevation for each 100 feet horizontal distance.

Percolation, soil-water. The downward movement of water through soil, especially the downward flow of water in saturated or nearly saturated soil at hydraulic gradients of the order of 1.0 or less.

Permeability. The quality that enables the soil to transmit water or air. Terms used to describe permeability are as follows: *very slow, slow, moderately slow, moderate, moderately rapid, rapid,* and *very rapid.*

Profile, soil. A vertical section of the soil through all its horizons and extending into the parent material.

Reaction, soil. The degree of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is precisely neutral in reaction because it is neither acid nor alkaline. An acid, or "sour," soil is one that gives an acid reaction; an alkaline soil is one that is alkaline in reaction. In words, the degrees of acidity or alkalinity are expressed thus:

	pH		*pH*
Extremely acid	Below 4.5	Mildly alkaline	7.4 to 7.8
Very strongly acid	4.5 to 5.0	Moderately alkaline	7.9 to 8.4
Strongly acid	5.1 to 5.5	Strongly alkaline	8.5 to 9.0
Medium acid	5.6 to 6.0	Very strongly alkaline	9.1 and higher
Slightly acid	6.1 to 6.5		
Neutral	6.6 to 7.3		

Sand. Individual rock or mineral fragments in a soil that range in diameter from 0.05 to 2.0 millimeters. Most sand grains consist of quartz, but they may be of any mineral composition. The textural class name of any soil that contains 85 percent or more sand and not more than 10 percent clay.

Series, soil. A group of soils developed from a particular type of parent material and having genetic horizons that, except for texture of the surface layer, are similar in differentiating characteristics and in arrangement in the profile.

Silt. Individual mineral particles in a soil that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). Soil of the silt textural class is 80 percent or more silt and less than 12 percent clay.

Soil. A natural, three-dimensional body on the earth's surface that supports plants and that has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Solum. The upper part of a soil profile, above the parent material, in which the processes of soil formation are active. The solum in mature soil includes the A and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and other plant and animal life characteristic of the soil are largely confined to the solum.

Structure, soil. The arrangement of primary soil particles into compound particles or clusters that are separated from adjoining aggregates and have properties unlike those of an equal mass of unaggregated primary soil particles. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular. Structureless* soils are either *single grain* (each grain by itself, as in dune sand) or *massive* (the particles adhering together without any regular cleavage, as in many claypans and hardpans).

Subgrade material. The prepared and compacted soil material, below the pavement system, called the "basement soil."

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Substratum. Technically, the part of the soil below the solum.

Surface soil. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, about 5 to 8 inches in thickness. The plowed layer.

Terrace (geological). An old alluvial plain, ordinarily flat or undulating, bordering a river, lake, or the sea. Stream terraces are frequently called second bottoms, as contrasted to flood plains, and are seldom subject to overflow. Marine terraces were deposited by the sea and are generally wide.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay.* The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Tilth, soil. The condition of the soil in relation to the growth of plants, especially soil structure. Good tilth refers to the friable state and is associated with high noncapillary porosity and stable, granular structure. A soil in poor tilth is nonfriable, hard, nonaggregated, and difficult to till.

Variant, soil. A soil having properties sufficiently different from those of other known soils to suggest establishing a new soil series, but a soil of such limited known area that creation of a new series is not believed to be justified.

Water table. The highest part of the soil or underlying rock material that is wholly saturated with water. In some places an upper, or perched, water table may be separated from a lower one by a dry zone.

Weathering. All physical and chemical changes produced in rocks at or near the earth's surface by atmospheric agents. These changes result in more or less complete disintegration and decomposition of the rock.

GUIDE TO MAPPING UNITS

For a full description of a mapping unit, read both the description of the mapping unit and the description of the soil series to which the mapping unit belongs. Other information is given in tables as follows:

Acreage and extent, table 3, page 11.
Predicted yields, table 4, page 70.
Woodland, table 5, page 72.
Recreation, table 7, page 86.
Engineering, tables 8, 9, 10, and 11, pages 90 to 135.

Map symbol	Mapping unit	Page	Capability unit		Woodland suitability group	Wildlife group	Recreation group
			Symbol	Page	Symbol	Number	Number
8E2	Hickory silt loam, 12 to 18 percent slopes, eroded	26	IVe-1	65	1r2	2	4
8E3	Hickory soils, 12 to 18 percent slopes, severely eroded	26	VIe-1	66	1r2	2	4
8F	Hickory silt loam, 18 to 30 percent slopes	26	VIe-1	66	1r2	3	4
8F3	Hickory soils, 18 to 30 percent slopes, severely eroded	27	VIe-1	66	1r2	3	4
19D3	Sylvan soils, 7 to 12 percent slopes, severely eroded	55	IVe-1	65	2o1	1	3
19E	Sylvan silt loam, 12 to 18 percent slopes	55	IVe-1	65	2r2	2	4
19E3	Sylvan soils, 12 to 18 percent slopes, severely eroded	55	VIe-1	66	2r2	2	4
19F	Sylvan silt loam, 18 to 30 percent slopes	55	VIe-1	66	2r2	3	4
19F3	Sylvan soils, 18 to 30 percent slopes, severely eroded	55	VIe-1	66	2r2	3	4
36A	Tama silt loam, 0 to 2 percent slopes	57	I-1	62	1o1	1	1
36B	Tama silt loam, 2 to 6 percent slopes	57	IIe-1	63	1o1	1	1
36C2	Tama silt loam, 4 to 7 percent slopes, eroded	57	IIe-1	63	1o1	1	1
36D2	Tama silt loam, 7 to 12 percent slopes, eroded	57	IIIe-1	64	1o1	1	3
41	Muscatine silt loam	41	I-2	62	2o1	4	5
45	Denny silt loam	20	IIw-1	63	3w2	6	7
61	Atterberry silt loam	13	I-2	62	3o1	4	5
63	Blown-out land	13	IVs-1	65	4s2	7	2
68	Sable silty clay loam	47	IIw-1	63	2w3	6	7
74	Radford silt loam	46	I-3	63	2o4	5	6
76	Otter silt loam	43	IIw-2	63	2w5	6	8
W76	Otter silt loam, wet	43	Vw	66	2w5	6	8
82	Millington silt loam	38	IIw-2	63	2w5	6	8
W82	Millington silt loam, wet	38	Vw	66	2w5	6	8
83	Wabash silty clay	60	IIIw-1	65	2w6	6	8
87A	Dickinson sandy loam, 0 to 4 percent slopes	21	IIIs-1	65	3s2	7	2
87C	Dickinson sandy loam, 4 to 12 percent slopes	21	IIIe-2	65	3s2	7	3
88B	Sparta sand, 0 to 6 percent slopes	53	IVs-1	65	4s2	7	2
107	Sawmill silty clay loam	48	IIw-2	63	2w5	6	8
W107	Sawmill silty clay loam, wet	49	Vw	66	2w5	6	8
172	Hoopeston sandy loam	32	IIs-3	64	3o1	4	5
239	Dorchester silt loam	21	I-3	63	2o4	5	6
250E	Velma silt loam, 12 to 18 percent slopes	59	IVe-1	65	1r2	2	4
261	Niota silt loam	41	IIIw-1	65	3w2	6	7
274B	Seaton silt loam, 2 to 6 percent slopes	49	IIe-1	63	2o1	1	1
274C2	Seaton silt loam, 4 to 7 percent slopes, eroded	49	IIe-1	63	2o1	1	1
274D2	Seaton silt loam, 7 to 12 percent slopes, eroded	50	IIIe-1	64	2o1	1	3
274E2	Seaton silt loam, 12 to 18 percent slopes, eroded	50	IVe-1	65	2r2	2	4
275	Joy silt loam	33	I-2	62	2o1	4	5
277A	Port Byron silt loam, 0 to 2 percent slopes	44	I-1	62	1o1	1	1
277B	Port Byron silt loam, 2 to 6 percent slopes	44	IIe-1	63	1o1	1	1

Map symbol	Mapping unit	Page	Capability unit		Woodland suitability group	Wildlife group	Recreation group
			Symbol	Page	Symbol	Number	Number
278	Stronghurst silt loam	54	IIw-1	63	3o1	4	5
279	Rozetta silt loam	47	I-1	62	2o1	1	1
280B	Fayette silt loam, 2 to 6 percent slopes	24	IIe-1	63	2o1	1	1
280C2	Fayette silt loam, 4 to 7 percent slopes, eroded	24	IIe-1	63	2o1	1	1
280D2	Fayette silt loam, 7 to 12 percent slopes, eroded	24	IIIe-1	64	2o1	1	3
280D3	Fayette soils, 7 to 12 percent slopes, severely eroded	25	IVe-1	65	2o1	1	3
304	Landes loamy fine sand	35	IVs-1	65	2o4	5	6
317	Millsdale silty clay loam	39	IIIw-1	65	2w3	6	7
347	Canisteo silt loam	16	IIw-1	63	2w3	6	7
386A	Downs silt loam, 0 to 2 percent slopes	22	I-1	62	2o1	1	1
386B	Downs silt loam, 2 to 6 percent slopes	22	IIe-1	63	2o1	1	1
400	Calco silty clay loam	15	IIw-2	63	2w5	6	8
W400	Calco silty clay loam, wet	15	Vw	66	2w5	6	8
415	Orion silt loam	43	I-3	63	2o4	5	6
428	Coffeen silt loam	18	I-3	63	2o4	5	6
430A	Raddle silt loam, 0 to 2 percent slopes	45	I-1	62	1o1	1	1
430B	Raddle silt loam, 2 to 6 percent slopes	45	IIe-1	63	1o1	1	1
451	Lawson silt loam	36	I-3	63	2o4	5	6
455	Mixed alluvial land	39	IIIw-2	65	2o4	5	6
465	Montgomery silty clay loam	40	IIIw-1	65	2w6	6	7
V506A	Hitt loam, shallow variant, 0 to 4 percent slopes	31	IIs-1	63	3o1	1	1
563B	Seaton silt loam, sandy substratum, 2 to 6 percent slopes	52	IIe-1	63	2o1	1	1
567D2	Elkhart silt loam, 7 to 12 percent slopes, eroded	23	IIIe-1	64	1o1	1	3
567E2	Elkhart silt loam, 12 to 18 percent slopes, eroded	23	IVe-1	65	2r2	2	4
570B	Martinsville silt loam, 2 to 7 percent slopes	37	IIe-1	63	2o1	1	1
570D3	Martinsville soils, 7 to 12 percent slopes, severely eroded	37	IVe-1	65	2o1	1	3
570E3	Martinsville soils, 12 to 18 percent slopes, severely eroded	37	VIe-1	66	1r2	2	4
577	Clayey terrace escarpments	17	VIe-2	66	2r2	2	4
G577	Gravelly terrace escarpments	25	VIs-1	67	3s3	7	4
647	Lawler loam	35	IIs-3	64	3o1	4	5
718	Marsh	36	------	--	---	6	8
727A	Waukee loam, 0 to 4 percent slopes	61	IIs-2	64	2o1	1	1
741C	Oakville fine sand, 2 to 12 percent slopes	42	IVs-1	65	4s2	7	3
741F	Oakville fine sand, 12 to 60 percent slopes	42	VIIs-1	68	3r3	7	4
763A	Joslin silt loam, 0 to 2 percent slopes	32	I-1	62	2o1	1	1
763B	Joslin silt loam, 2 to 6 percent slopes	33	IIe-1	63	2o1	1	1
764A	Coyne fine sandy loam, 0 to 4 percent slopes	19	IIs-2	64	3s2	1	1
764C	Coyne fine sandy loam, 4 to 12 percent slopes	19	IIIe-2	65	3s2	1	3
765A	Trempealeau silt loam, 0 to 4 percent slopes	59	IIs-2	64	2o1	1	1
774	Saude loam	48	IIs-2	64	3s2	7	2
942D2	Seaton-Oakville complex, 7 to 12 percent slopes, eroded	50	VIs-1	67	4s2	7	3
942E2	Seaton-Oakville complex, 12 to 18 percent slopes, eroded	50	VIIs-1	68	4s2	7	4
942F2	Seaton-Oakville complex, 18 to 30 percent slopes, eroded	50	VIIs-1	68	3r3	7	4

GUIDE TO MAPPING UNITS--Continued

Map symbol	Mapping unit	Page	Capability unit		Woodland suitability group	Wildlife group	Recreation group
			Symbol	Page	Symbol	Number	Number
943D2	Seaton-Timula silt loams, 7 to 12 percent slopes, eroded	51	IIIe-1	64	3o1	1	3
943E2	Seaton-Timula silt loams, 12 to 18 percent slopes, eroded	51	IVe-1	65	3r2	2	4
943F2	Seaton-Timula silt loams, 18 to 30 percent slopes, eroded	51	VIe-1	66	3r2	3	4
944E2	Velma-Coatsburg silt loams, 12 to 18 percent slopes, eroded	60	VIe-2	66	3r2	2	4
945E2	Hickory-High Gap silt loams, 12 to 18 percent slopes, eroded	27	VIe-2	66	3r2	2	4
945F	Hickory-High Gap silt loams, 18 to 30 percent slopes	28	VIIe-2	68	3r2	3	4
945G	Hickory-High Gap silt loams, 30 to 60 percent slopes	28	VIIe-2	68	3r3	3	4
946E3	Hickory-Atlas complex, 12 to 18 percent slopes, severely eroded	27	VIIe-2	68	3r2	2	4
946F3	Hickory-Atlas complex, 18 to 30 percent slopes, severely eroded	27	VIIe-2	68	3r2	3	4
947C2	Lamont, Tell, and Bloomfield soils, 4 to 12 percent slopes, eroded	34	IIIe-2	68	3s2	7	3
947F2	Lamont, Tell, and Bloomfield soils, 12 to 30 percent slopes, eroded	34	VIs-1	67	3s3	7	4
959G	Strawn-Chute complex, 25 to 60 percent slopes	53	VIIe-1	67	3r3	7	4
960E2	Hickory-Sylvan-Fayette silt loams, 12 to 18 percent slopes, eroded	28	IVe-1	65	1r2	2	4
960E3	Hickory-Sylvan-Fayette complex, 12 to 18 percent slopes, severely eroded	29	VIe-1	66	1r2	2	4
960F	Hickory-Sylvan-Fayette silt loams, 18 to 30 percent slopes	29	VIe-1	66	1r2	3	4
960F3	Hickory-Sylvan complex, 18 to 30 percent slopes, severely eroded	29	VIe-1	66	1r2	3	4
960G	Hickory-Sylvan silt loams, 30 to 60 percent slopes	29	VIIe-1	67	3r3	3	4
961A	Burkhardt-Saude complex, 0 to 4 percent slopes	14	IIIs-1	65	3s2	7	2
962F	Sylvan-Bold silt loams, 18 to 60 percent slopes	56	VIe-1	66	2r2	3	4
B.P.	Borrow pit	14	-------	--	---	---	---
C.F.	Cut and fill land	19	-------	--	---	---	---
G.P.	Gravel pit	25	-------	--	---	---	---
Qu.	Quarry	44	-------	--	---	---	---

☆ U.S. GOVERNMENT PRINTING OFFICE: 1977— 567-254/28

NRCS Accessibility Statement

This document is not accessible by screen-reader software. The Natural Resources Conservation Service (NRCS) is committed to making its information accessible to all of its customers and employees. If you are experiencing accessibility issues and need assistance, please contact our Helpdesk by phone at 1-800-457-3642 or by e-mail at ServiceDesk-FTC@ftc.usda.gov. For assistance with publications that include maps, graphs, or similar forms of information, you may also wish to contact our State or local office. You can locate the correct office and phone number at http://offices.sc.egov.usda.gov/locator/app.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

N

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
ILLINOIS AGRICULTURAL EXPERIMENT STATION

GENERAL SOIL MAP

ROCK ISLAND COUNTY, ILLINOIS

Scale 1:253,440
1 0 1 2 3 4 Miles

SOIL ASSOCIATIONS

1 — Fayette-Sylvan-Hickory association: Gently sloping to very steep, well drained and moderately well drained soils formed in loess or loamy glacial till; on uplands

2 — Muscatine-Tama association: Nearly level to strongly sloping, somewhat poorly drained and well drained soils formed in loess; on uplands

3 — Hickory-High Gap association: Moderately steep to very steep, well drained and moderately well drained soils formed in loamy glacial till or in loamy glacial till and in the underlying weathered shale; on uplands

4 — Seaton-Oakville-Lamont association: Gently sloping to very steep, well-drained soils formed in loess or sandy material; on uplands

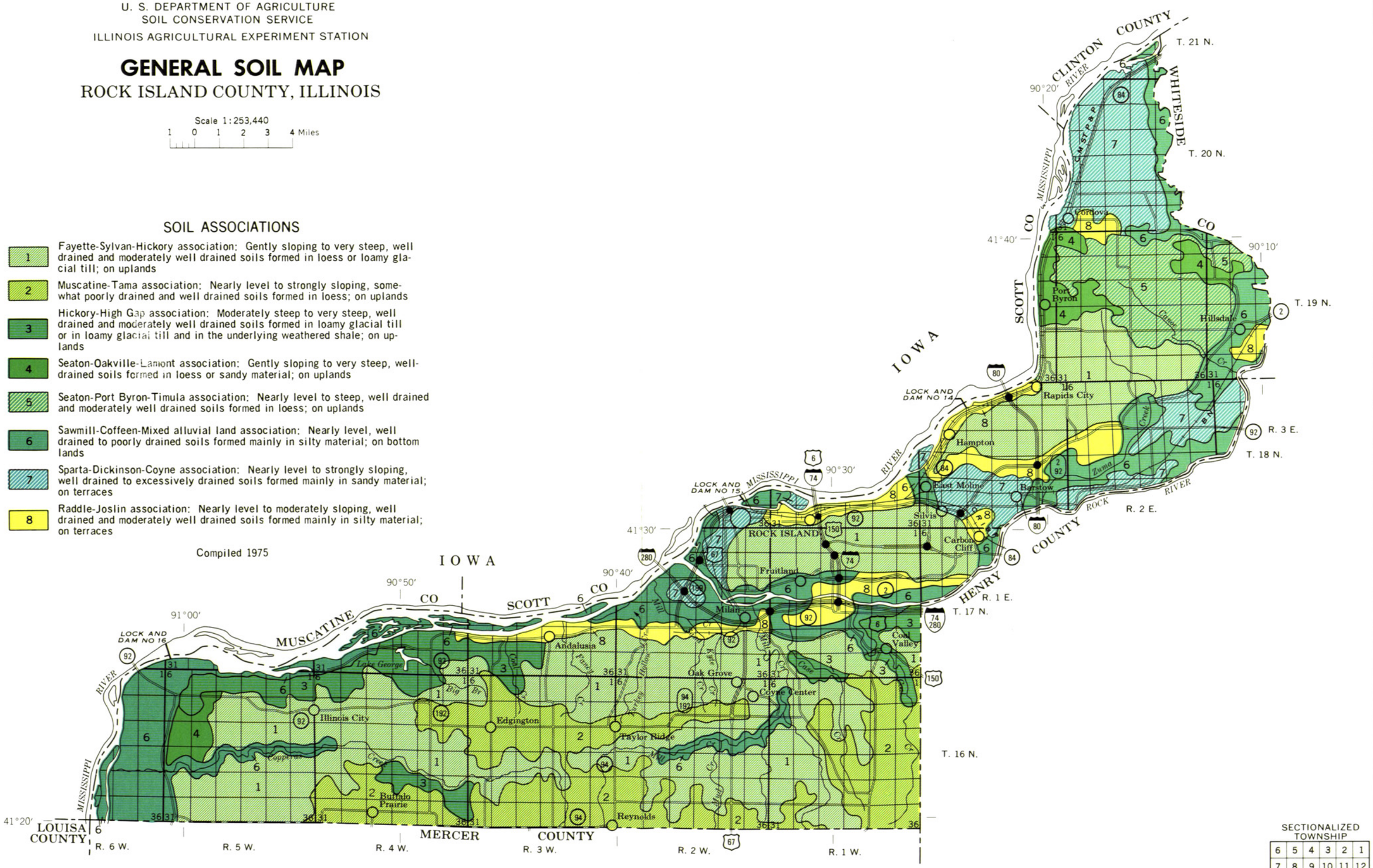
5 — Seaton-Port Byron-Timula association: Nearly level to steep, well drained and moderately well drained soils formed in loess; on uplands

6 — Sawmill-Coffeen-Mixed alluvial land association: Nearly level, well drained to poorly drained soils formed mainly in silty material; on bottom lands

7 — Sparta-Dickinson-Coyne association: Nearly level to strongly sloping, well drained to excessively drained soils formed mainly in sandy material; on terraces

8 — Raddle-Joslin association: Nearly level to moderately sloping, well drained and moderately well drained soils formed mainly in silty material; on terraces

Compiled 1975



SECTIONALIZED TOWNSHIP

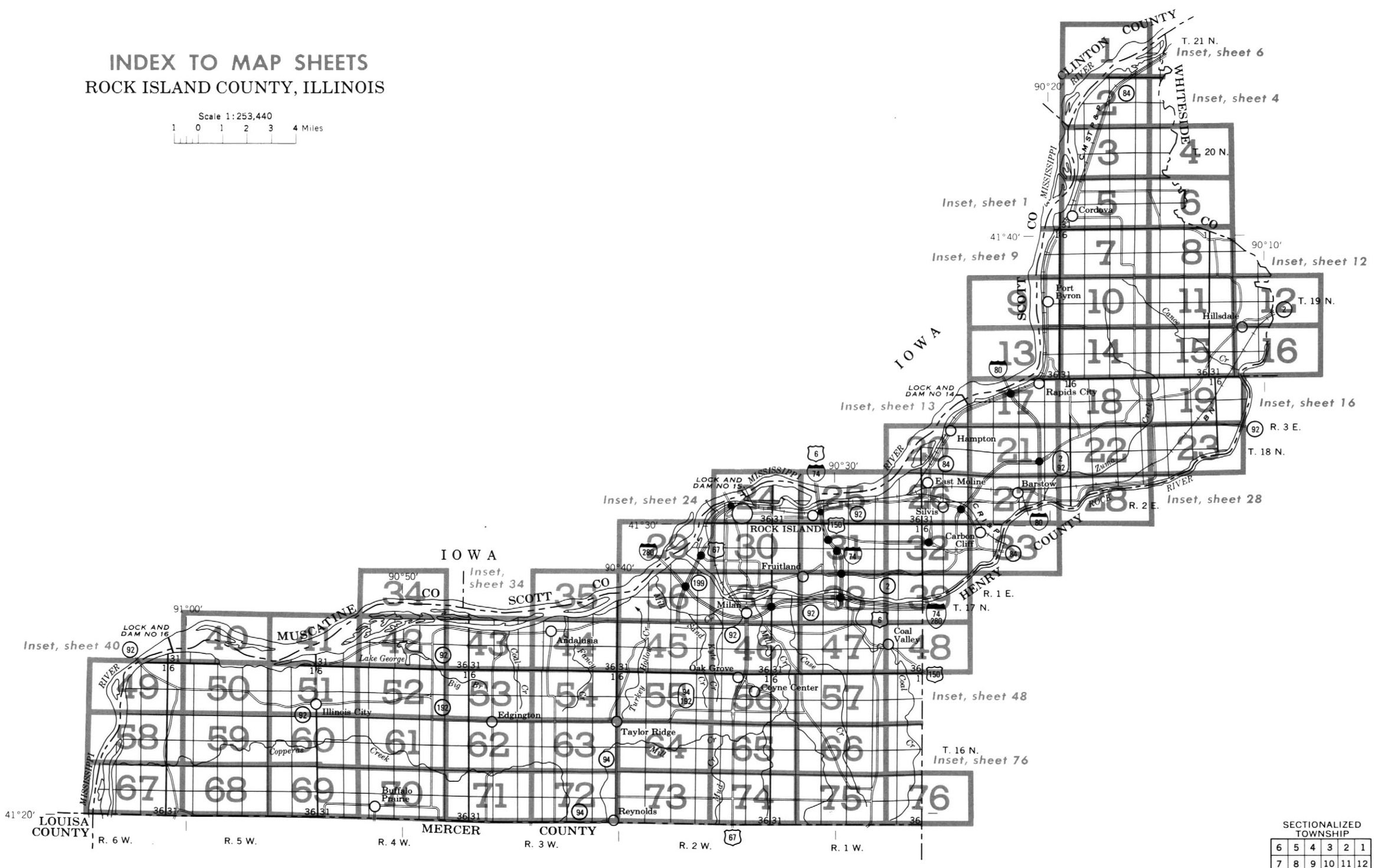
6	5	4	3	2	1
7	8	9	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33	34	35	36

Each area outlined on this map consists of more than one kind of soil. The map is thus meant for general planning rather than a basis for decisions on the use of specific tracts.

INDEX TO MAP SHEETS
ROCK ISLAND COUNTY, ILLINOIS

Scale 1:253,440

1 0 1 2 3 4 Miles



SECTIONALIZED TOWNSHIP

6	5	4	3	2	1
7	8	9	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33	34	35	36

SOIL LEGEND

Each soil symbol consists of a combination of two or three numerals representing a series. A letter representing the class of slope and a number indicating whether the soil is eroded or severely eroded may also be present. The letter G may precede the soil number to indicate high gravel content, V to indicate a shallow variant, or W to indicate a wet phase. Two capital letters or a capital letter and a lower case letter indicate a miscellaneous land type.

SYMBOL	NAME
8E2	Hickory silt loam, 12 to 18 percent slopes, eroded
8E3	Hickory soils, 12 to 18 percent slopes, severely eroded
8F	Hickory silt loam, 18 to 30 percent slopes
8F3	Hickory soils, 18 to 30 percent slopes, severely eroded
19D3	Sylvan soils, 7 to 12 percent slopes, severely eroded
19E	Sylvan silt loam, 12 to 18 percent slopes
19E3	Sylvan soils, 12 to 18 percent slopes, severely eroded
19F	Sylvan silt loam, 18 to 30 percent slopes
19F3	Sylvan soils, 18 to 30 percent slopes, severely eroded
36A	Tama silt loam, 0 to 2 percent slopes
36B	Tama silt loam, 2 to 6 percent slopes
36C2	Tama silt loam, 4 to 7 percent slopes, eroded
36D2	Tama silt loam, 7 to 12 percent slopes, eroded
41	Muscatine silt loam
45	Denny silt loam
61	Atterberry silt loam
63	Blown-out land
68	Sable silty clay loam
74	Radford silt loam
76	Otter silt loam
W76	Otter silt loam, wet
82	Millington silt loam
W82	Millington silt loam, wet
83	Wabash silty clay
87A	Dickinson sandy loam, 0 to 4 percent slopes
87C	Dickinson sandy loam, 4 to 12 percent slopes
88B	Sparta sand, 0 to 6 percent slopes
107	Sawmill silty clay loam
W107	Sawmill silty clay loam, wet
172	Hoopeston sandy loam
239	Dorchester silt loam
250E	Velma silt loam, 12 to 18 percent slopes
261	Niota silt loam
274B	Seaton silt loam, 2 to 6 percent slopes
274C2	Seaton silt loam, 4 to 7 percent slopes, eroded
274D2	Seaton silt loam, 7 to 12 percent slopes, eroded
274E2	Seaton silt loam, 12 to 18 percent slopes, eroded
275	Joy silt loam
277A	Port Byron silt loam, 0 to 2 percent slopes
277B	Port Byron silt loam, 2 to 6 percent slopes
278	Stronghurst silt loam
279	Rozetta silt loam
280B	Fayette silt loam, 2 to 6 percent slopes
280C2	Fayette silt loam, 4 to 7 percent slopes, eroded
280D2	Fayette silt loam, 7 to 12 percent slopes, eroded
280D3	Fayette soils, 7 to 12 percent slopes, severely eroded
304	Landes loamy fine sand
317	Millsdale silty clay loam
347	Canisteo silt loam
386A	Downs silt loam, 0 to 2 percent slopes
386B	Downs silt loam, 2 to 6 percent slopes
400	Calco silty clay loam
W400	Calco silty clay loam, wet
415	Orion silt loam
428	Coffeen silt loam
430A	Raddle silt loam, 0 to 2 percent slopes
430B	Raddle silt loam, 2 to 6 percent slopes
451	Lawson silt loam
455	Mixed alluvial land
465	Montgomery silty clay loam
V506A	Hitt loam, shallow variant, 0 to 4 percent slopes
563B	Seaton silt loam, sandy substratum, 2 to 6 percent slopes
567D2	Elkhart silt loam, 7 to 12 percent slopes, eroded
567E2	Elkhart silt loam, 12 to 18 percent slopes, eroded
570B	Martinsville silt loam, 2 to 7 percent slopes
570D3	Martinsville soils, 7 to 12 percent slopes, severely eroded
570E3	Martinsville soils, 12 to 18 percent slopes, severely eroded
577	Clayey terrace escarpments
G577	Gravelly terrace escarpments
647	Lawler loam
718	Marsh
727A	Waukee loam, 0 to 4 percent slopes
741C	Oakville fine sand, 2 to 12 percent slopes
741F	Oakville fine sand, 12 to 60 percent slopes
763A	Joslin silt loam, 0 to 2 percent slopes
763B	Joslin silt loam, 2 to 6 percent slopes
764A	Coyne fine sandy loam, 0 to 4 percent slopes
764C	Coyne fine sandy loam, 4 to 12 percent slopes
765A	Trempealeau silt loam, 0 to 4 percent slopes
774	Saude loam
942D2	Seaton-Oakville complex, 7 to 12 percent slopes, eroded
942E2	Seaton-Oakville complex, 12 to 18 percent slopes, eroded
942F2	Seaton-Oakville complex, 18 to 30 percent slopes, eroded
943D2	Seaton-Timula silt loams, 7 to 12 percent slopes, eroded
943E2	Seaton-Timula silt loams, 12 to 18 percent slopes, eroded
943F2	Seaton-Timula silt loams, 18 to 30 percent slopes, eroded
944E2	Velma-Coatsburg silt loams, 12 to 18 percent slopes, eroded
945E2	Hickory-High Gap silt loams, 12 to 18 percent slopes, eroded
945F	Hickory-High Gap silt loams, 18 to 30 percent slopes
945G	Hickory-High Gap silt loams, 30 to 60 percent slopes
946E3	Hickory-Atlas complex, 12 to 18 percent slopes, severely eroded
946F3	Hickory-Atlas complex, 18 to 30 percent slopes, severely eroded
947C2	Lamont, Tell, and Bloomfield soils, 4 to 12 percent slopes, eroded
947F2	Lamont, Tell, and Bloomfield soils, 12 to 30 percent slopes, eroded
959G	Strawn-Chute complex, 25 to 60 percent slopes
960E2	Hickory-Sylvan-Fayette silt loams, 12 to 18 percent slopes, eroded
960E3	Hickory-Sylvan-Fayette complex, 12 to 18 percent slopes, severely eroded
960F	Hickory-Sylvan-Fayette silt loams, 18 to 30 percent slopes
960F3	Hickory-Sylvan complex, 18 to 30 percent slopes, severely eroded
960G	Hickory-Sylvan silt loams, 30 to 60 percent slopes
961A	Burkhardt-Saude complex, 0 to 4 percent slopes
962F	Sylvan-Bold silt loams, 18 to 60 percent slopes
B.P.	Borrow pit
C.F.	Cut and fill land
G.P.	Gravel pit
Qu.	Quarry

ROCK ISLAND COUNTY, ILLINOIS

CONVENTIONAL SIGNS

WORKS AND STRUCTURES

Highways and roads

- Divided
- Good motor
- Poor motor
- Trail

Highway markers

- National Interstate
- U. S.
- State or county

Railroads

- Single track
- Multiple track
- Abandoned

Bridges and crossings

- Road
- Trail
- Railroad
- Ferry — FY
- Ford — FORD
- Grade
- R. R. over
- R. R. under

Buildings

- School
- Church

Mine and quarry — QU.

Gravel pit — G.P.

Power line

Pipeline

Cemetery

Dams

Levee

Tanks

Well, oil or gas

Forest fire or lookout station

Windmill

Located object

BOUNDARIES

- National or state
- County
- Minor civil division
- Reservation
- Land grant
- Small park, cemetery, airport
- Land survey division corners

DRAINAGE

Streams, double-line

- Perennial
- Intermittent

Streams, single-line

- Perennial
- Intermittent
  - Crossable with tillage implements
  - Not crossable with tillage implements
  - Unclassified

Canals and ditches

Lakes and ponds

- Perennial — water, w
- Intermittent — int

Spring

Marsh or swamp

Wet spot

Drainage end or alluvial fan

RELIEF

Escarpments

- Bedrock
- Other

Short steep slope

Prominent peak

Depressions

	Large	Small
Crossable with tillage implements		
Not crossable with tillage implements		
Contains water most of the time		

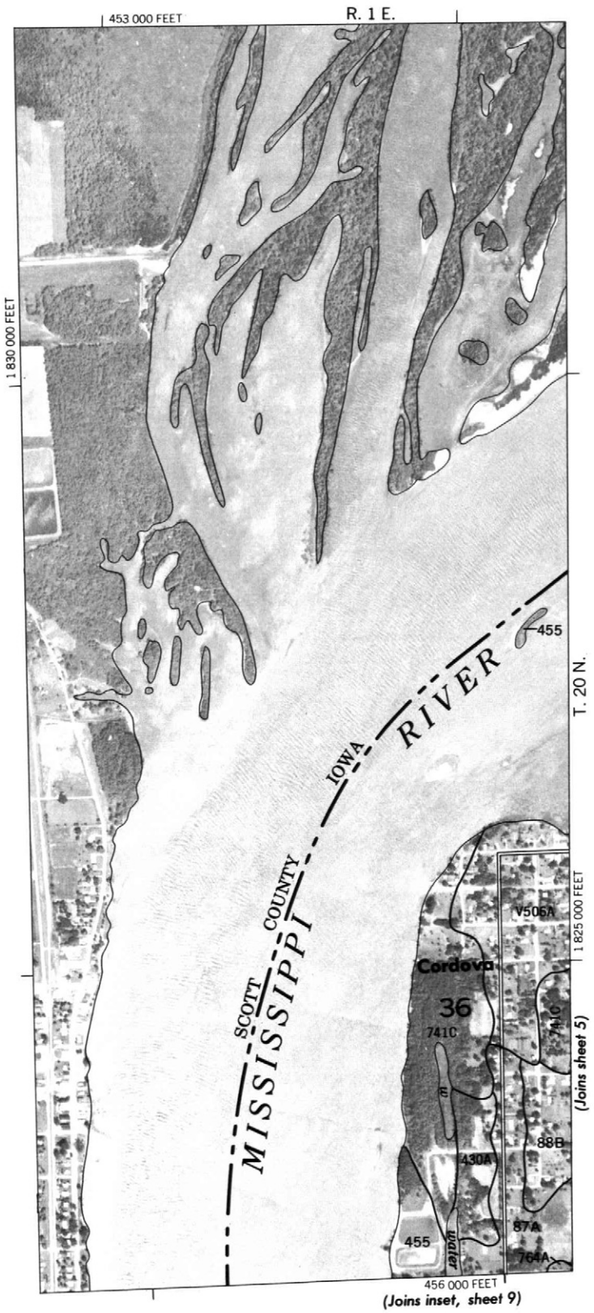
SOIL SURVEY DATA

- Soil boundary and symbol — Dx
- Gravel
- Stoniness
  - Stony
  - Very stony
- Rock outcrops
- Chert fragments
- Clay spot
- Sand spot
- Gumbo or scabby spot
- Made land — M.L.
- Severely eroded spot
- Blowout, wind erosion
- Gully
- Borrow pit — B.P.
- Cut and fill land — C.F.L.
- Denny spots less than 2 acres

ROCK ISLAND COUNTY, ILLINOIS — SHEET NUMBER 1

ROCK ISLAND COUNTY, ILLINOIS NO. 1

This map is compiled on 1973 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.



3000 AND 5000-FOOT GRID TICKS

1

N

1 Mile
5 000 Feet

Scale 1:15 840

0 ¼ ½ ¾ 1
0 1 000 2 000 3 000 4 000 5 000

This map is compiled on 1973 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

ROCK ISLAND COUNTY, ILLINOIS NO. 2

ROCK ISLAND COUNTY, ILLINOIS — SHEET NUMBER 3

ROCK ISLAND COUNTY, ILLINOIS NO. 3

This map is compiled on 1973 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

3

N

1 Mile

5 000 Feet

Scale 1:15 840

0 1/4 1/2 3/4 1 000 2 000 3 000 4 000 5 000

460 000 FEET

1 840 000 FEET

1 835 000 FEET

475 000 FEET

R. 2 E.

T. 20 N.

(Joins sheet 2)

(Joins sheet 4)

(Joins sheet 5)

MISSISSIPPI RIVER

SCOTT COUNTY, IOWA

CUT AND FILL LAND

CUT AND FILL LAND

CHICAGO, ROCK ISLAND AND PACIFIC

ST. PAUL

MILWAUKEE

CHICAGO

84

17

18

19

20

21

22

15

16

88B

87A

455

727A

741F

961A

774

261

430B

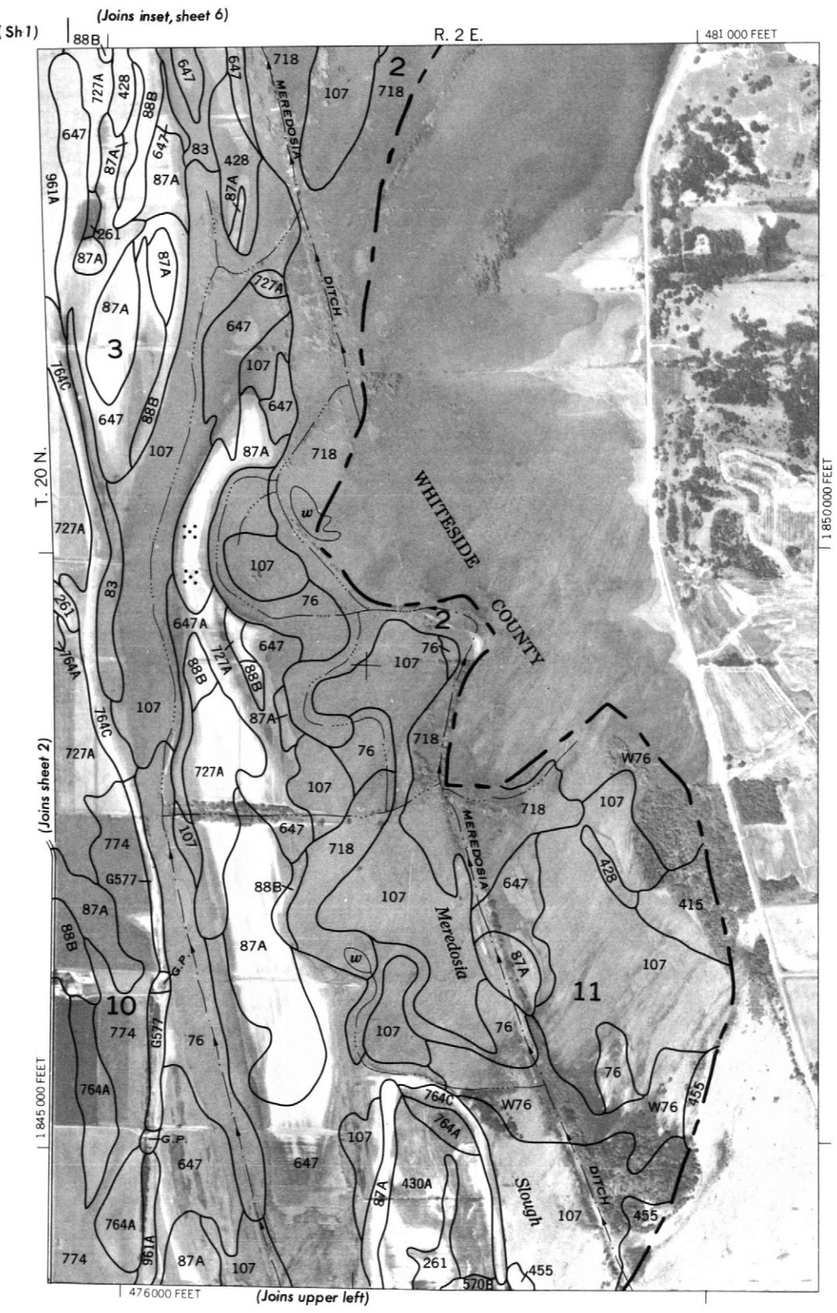
647

4

N

1 Mile 5 000 Feet

0 Scale 1:15 840



This map is compiled on 1973 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

ROCK ISLAND COUNTY, ILLINOIS NO. 4

ROCK ISLAND COUNTY, ILLINOIS — SHEET NUMBER 5

ROCK ISLAND COUNTY, ILLINOIS NO. 5

This map is compiled on 1973 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

5

N

1 Mile

5 000 Feet

Scale 1:15 840

0 0

¼ 1 000

½ 2 000

¾ 3 000

1 4 000

5 000

R. 2 E.

T. 20 N.

460 000 FEET

1 830 000 FEET

1 825 000 FEET

475 000 FEET

(Joins sheet 3)

(Joins sheet 6)

(Joins sheet 7)

(Joins inset, sheet 1)

IOWA

MISSISSIPPI RIVER

SCOTT COUNTY

Cordova

CHICAGO, MILWAUKEE, ST. PAUL AND PACIFIC R.R.

CHICAGO, ROCK ISLAND & PACIFIC R.R.

84

451

455

30 29 28 27

31 32 33 34

88B 727A 87A 961A 741C 430A V506A 741F 942F2 274C2 465 415 261 63 107

6

N

1 Mile

5 000 Feet

Scale 1:15 840

0 ¼ ½ ¾ 1

0 1 000 2 000 3 000 4 000 5 000

This map is compiled on 1973 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

ROCK ISLAND COUNTY, ILLINOIS NO. 6

ROCK ISLAND COUNTY, ILLINOIS — SHEET NUMBER 7

ROCK ISLAND COUNTY, ILLINOIS NO. 7

460 000 FEET

R. 2 E.

(Joins sheet 5)

1 820 000 FEET

T. 19 N.

(Joins inset, sheet 9)

(Joins sheet 8)

1 815 000 FEET

274D2

563B

(Joins sheet 10)

475 000 FEET

BAKER CEMETERY

B.P.

7

1 Mile

5 000 Feet

Scale 1:15 840

ROCK ISLAND COUNTY, ILLINOIS — SHEET NUMBER 8

8

N

1 Mile

5 000 Feet

Scale 1:15 840

0 ¼ ½ ¾ 1

1 000 2 000 3 000 4 000 5 000

R. 2 E. | R. 3 E.

490 000 FEET

1 820 000 FEET

1 815 000 FEET

475 000 FEET

T. 19 N.

MEREDOSIA DITCH

WHITESIDE COUNTY

(Joins sheet 6)

(Joins sheet 7)

(Joins sheet 11)

(Joins inset, sheet 12)

This map is compiled on 1973 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

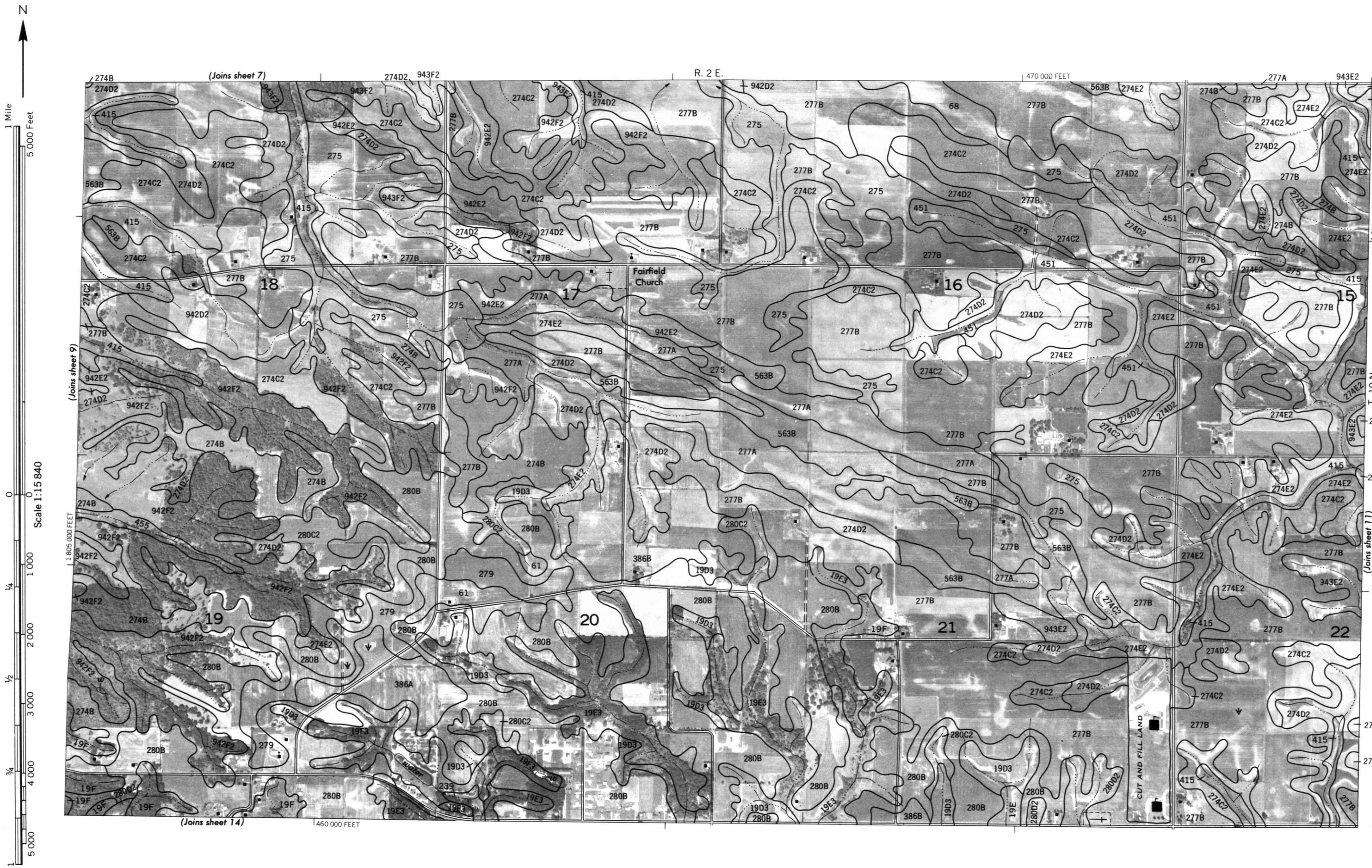
ILLINOIS NO. 8

ROCK ISLAND COUNTY, ILLINOIS

ROCK ISLAND COUNTY, ILLINOIS NO. 9

This map is compiled on 1973 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

ROCK ISLAND COUNTY, ILLINOIS — SHEET NUMBER 10



This map is compiled on 1973 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

ROCK ISLAND COUNTY, ILLINOIS — SHEET NUMBER 11

ROCK ISLAND COUNTY, ILLINOIS NO. 11

This map is compiled on 1973 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

11

N

1 Mile

5 000 Feet

Scale 1:15 840

475 000 FEET

1 810 000 FEET

1 805 000 FEET

490 000 FEET

R. 2 E. | R. 3 E.

T. 19 N.

(Joins sheet 8)

(Joins sheet 10)

(Joins sheet 12)

(Joins sheet 15)

Bethel Church

MOUNT MORIAH CEMETERY

13 14 15 18 19 22 23 24

This map is compiled on 1973 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

ROCK ISLAND COUNTY, ILLINOIS NO. 12

ROCK ISLAND COUNTY, ILLINOIS NO. 13

This map is compiled on 1973 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

440 000 FEET

R. 1 E.

(Joins sheet 9)

1 800 000 FEET

431 000 FEET

R. 1 E.

1 787 000 FEET

LOCK AND DAM NO. 14

IOWA

SCOTT COUNTY

MISSISSIPPI RIVER

R. 18 N.

(Joins sheet 17)

1 782 000 FEET

(Joins sheet 20)

436 000 FEET

(Joins sheet 14) T. 19 N.

1 795 000 FEET

455 000 FEET

(Joins sheet 17)

(Joins 18)

Port Byron

Hampton

water

GRAVEL PIT

QUARRY

C. F. L.

ST. PAUL AND PACIFIC

MILWAUKEE

CHICAGO

Scale 1:15 840

1 Mile

5 000 Feet

(14)

N

1 Mile

5 000 Feet

0

Scale 1:15 840

1/4 1 000

1/2 2 000

3/4 3 000

1 4 000

1 1/4 5 000

(Joins sheet 10)

R. 2 E.

470 000 FEET

1 800 000 FEET

T. 19 N.

1 795 000 FEET

460 000 FEET

(Joins sheet 13)

(Joins sheet 15)

(Joins sheet 18)

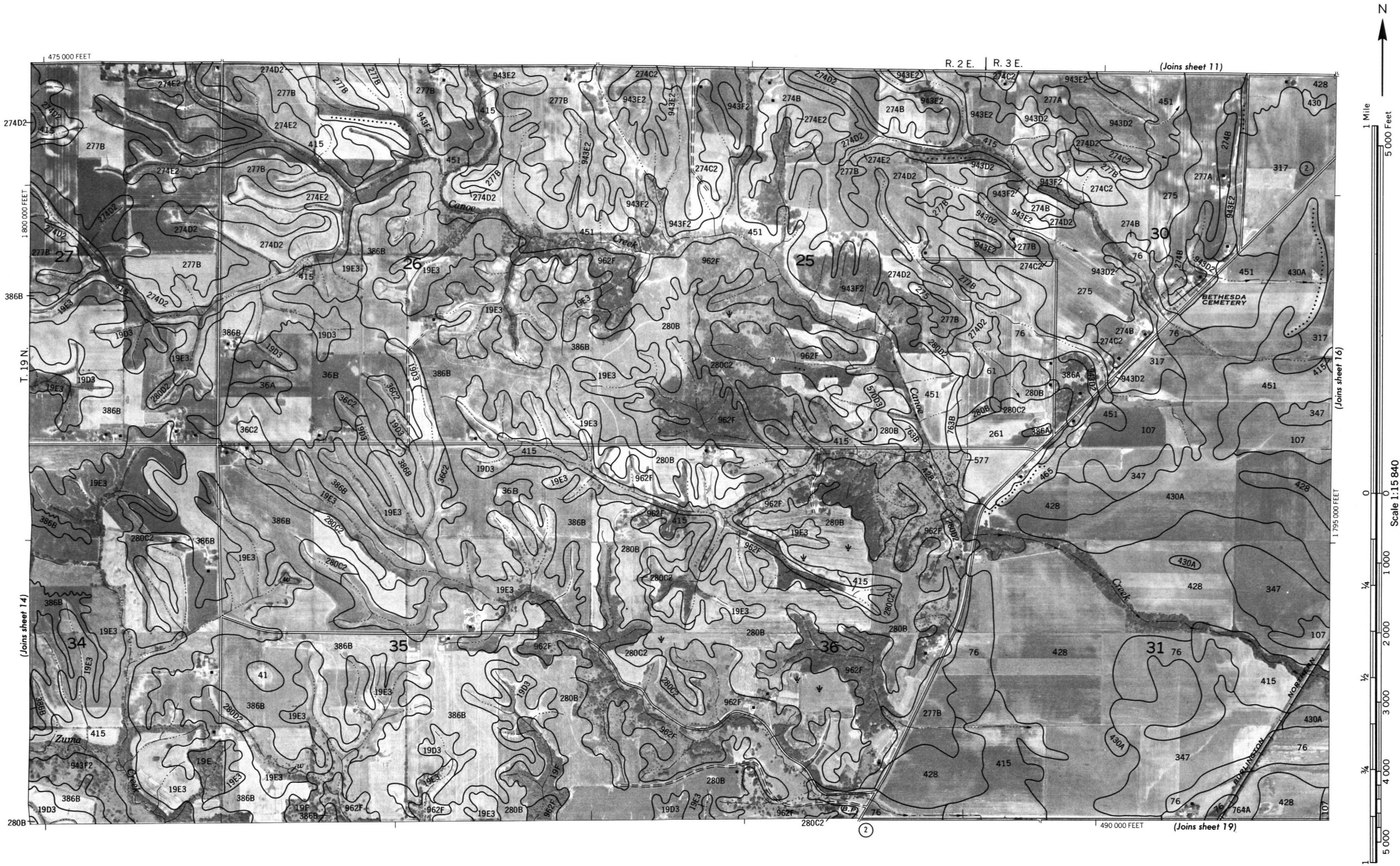
30 29 28 27

31 32 33 34

Zuma Creek

This map is compiled on 1973 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

ROCK ISLAND COUNTY, ILLINOIS NO. 14



ROCK ISLAND COUNTY, ILLINOIS NO. 15

This map is compiled on 1973 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

16

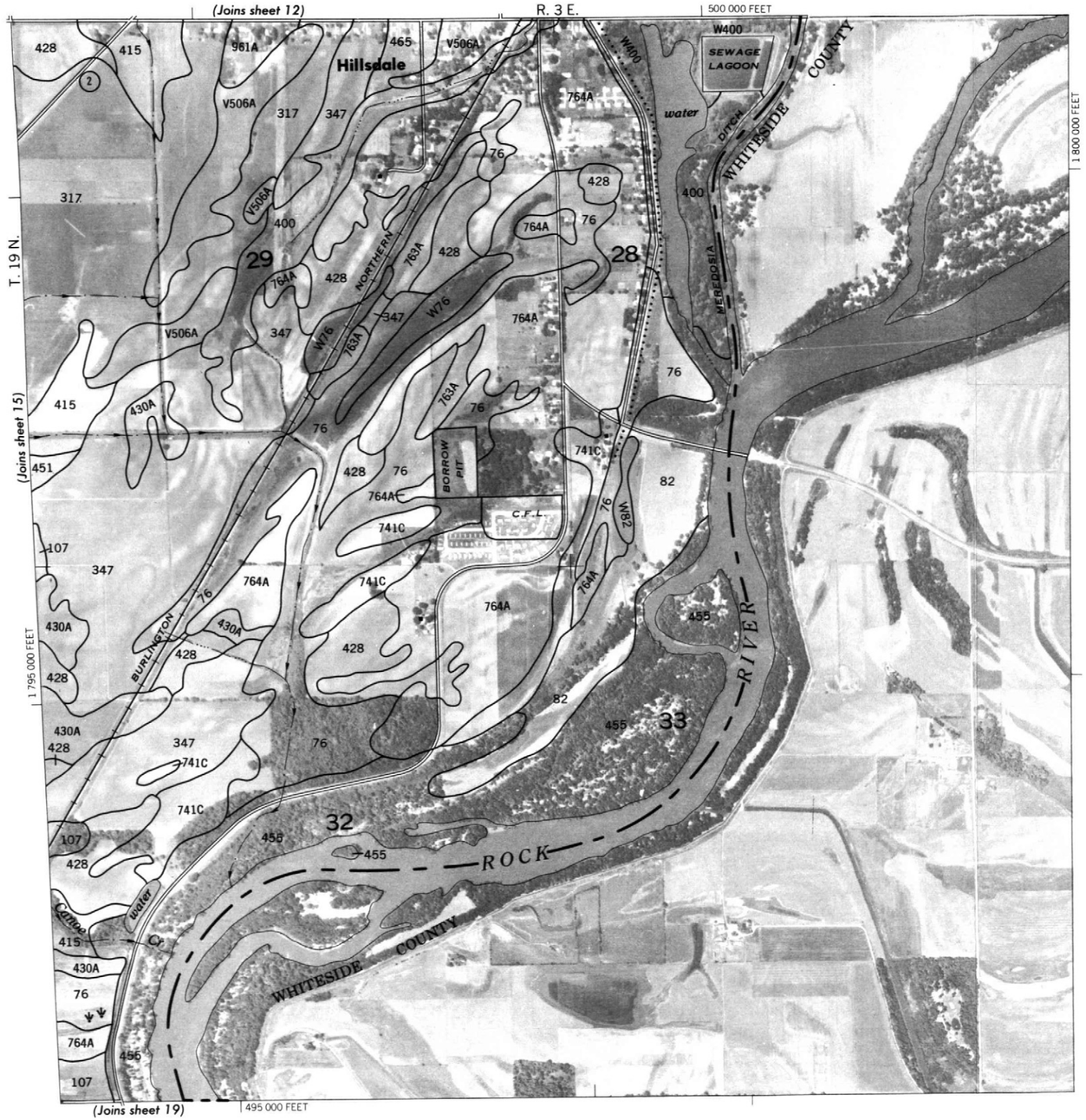
N

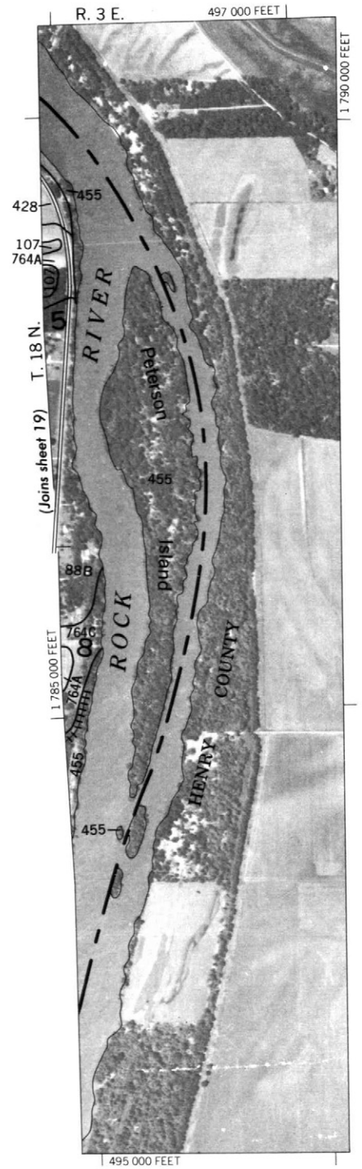
1 Mile

5 000 Feet

Scale 1:15 840

0 0 ¼ 1 000 ½ 2 000 ¾ 4 000 1 5 000





This map is compiled on 1973 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

ROCK ISLAND COUNTY, ILLINOIS NO. 16

N

440 000 FEET

1 790 000 FEET

R. 1 E.

T. 18 N.

(Joins sheet 13)

(Joins inset, sheet 13)

(Joins sheet 18)

(Joins sheet 21)

455 000 FEET

1 785 000 FEET

SCOTT COUNTY IOWA

MISSISSIPPI RIVER

LOCK AND DAM NO 14

CHICAGO, MILWAUKEE AND ST. PAUL

CUT AND FILL LAND

PACIFIC

C.F.L.

Rapids City

1 Mile

5 000 Feet

Scale 1:15 840

0 0 ¼ 1 000 ½ 2 000 ¾ 4 000 1 5 000

ROCK ISLAND COUNTY, ILLINOIS NO. 17

ROCK ISLAND COUNTY, ILLINOIS — SHEET NUMBER 18

18

N

1 Mile

5 000 Feet

Scale 1:15 840

0 1/4 1/2 3/4 1

1 000 2 000 3 000 4 000 5 000

(Joins 13) (Joins sheet 14) R. 1 E. R. 2 E.

470 000 FEET

1 790 000 FEET

T. 18 N.

(Joins sheet 19)

(Joins sheet 17)

1 785 000 FEET

460 000 FEET

19F (Joins sheet 22)

This map is compiled on 1973 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

ROCK ISLAND COUNTY, ILLINOIS NO. 18

This map is compiled on 1973 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

ROCK ISLAND COUNTY, ILLINOIS NO. 19

N

1 Mile
5 000 Feet

Scale 1:15 840

20

N

1 Mile

5 000 Feet

Scale 1:15 840

R. 1 W. | R. 1 E.

435 000 FEET

(Joins inset, sheet 13)

1 780 000 FEET

T. 18 N.

1 775 000 FEET

420 000 FEET

RIVER

SCOTT COUNTY, IOWA

MISSISSIPPI

Hampton

Campbells Island

CAMPBELLS ISLAND STATE PARK

HAMPTON CEMETERY

EAST MOLINE

CUT AND FILL LAND

Creek

Sugar

PACIFIC

ST PAUL AND MILWAUKEE

CHICAGO

(Joins sheet 21)

(Joins sheet 26)

This map is compiled on 1973 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

ROCK ISLAND COUNTY, ILLINOIS NO. 20

This map is compiled on 1973 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

21

N

1 Mile

5 000 Feet

Scale 1:15 840

0 1/4 1/2 3/4 1

1 000 2 000 3 000 4 000 5 000

440 000 FEET

455 000 FEET

1 780 000 FEET

1 775 000 FEET

R. 1 E.

T. 18 N.

(Joins sheet 17)

(Joins sheet 20)

(Joins sheet 22)

(Joins sheet 27)

13 14 15 16 21 22 23 24

C.F.L.

B.P.

Zuma Cr.

ROCK ISLAND COUNTY, ILLINOIS — SHEET NUMBER 22

22

N

1 Mile

5 000 Feet

Scale 1:15 840

R. 1 E. | R. 2 E.

(Joins sheet 18)

(Joins sheet 21)

(Joins sheet 23)

(Joins sheet 28)

1 775 000 FEET

1 780 000 FEET

470 000 FEET

460 000 FEET

T. 18 N.

Zuma Creek

NORTHERN BURLINGTON

QUARRY

This map is compiled on 1973 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

ROCK ISLAND COUNTY, ILLINOIS NO. 22

ROCK ISLAND COUNTY, ILLINOIS NO. 23

23

N

1 Mile

5 000 Feet

Scale 1:15 840

ROCK ISLAND COUNTY, ILLINOIS — SHEET NUMBER 24

24

N

1 Mile

5 000 Feet

Scale 1:15 840

0 ¼ ½ ¾ 1

0 1 000 2 000 3 000 4 000 5 000

R. 2 W. | 382 000 FEET | R. 1 W. | 400 000 FEET

1 765 000 FEET

1 762 000 FEET

1 770 000 FEET

T. 18 N.

SCOTT COUNTY IOWA

MISSISSIPPI RIVER

(Joins lower left)

34

C.F.L.

380 000 FEET

(Joins sheet 29)

2000 AND 3000-FOOT GRID TICKS

LOCK AND DAM NO. 15

ROCK ISLAND ARSENAL

CUT AND FILL LAND

CONFEDERATE CEMETERY

MOLINE POOL

SYLVAN ISLAND

SYLVAN SLOUGH

ROCK ISLAND

(county seat)

MOLINE

CHICAGO MILWAUKEE ST PAUL AND PACIFIC

ROCK ISLAND BURLINGTON AND NORTHERN

25 30 31 35 36

(Joins sheet 25)

(Joins inset)

(Joins sheet 30)

385 000 FEET

This map is compiled on 1973 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

ROCK ISLAND COUNTY, ILLINOIS NO. 24

ROCK ISLAND COUNTY, ILLINOIS — SHEET NUMBER 25

25

N

405 000 FEET

R. 1 W.

1 770 000 FEET

T. 18 N.

MISSISSIPPI RIVER

SCOTT COUNTY IOWA

ROCK ISLAND

ROCK ISLAND ARSENAL

NATIONAL CEMETERY

POOL

MOLINE

RIVERSIDE CEMETERY

CUT AND FILL LAND

CHICAGO ROCK ISLAND AND PACIFIC

MILWAUKEE AND ST PAUL PACIFIC

CHICAGO BURLINGTON AND NORTHERN

C.F.L.

29 32 33 34 35

(Joins sheet 24)

(Joins sheet 26)

(Joins sheet 31)

1 765 000 FEET

415 000 FEET

1 Mile

5 000 Feet

Scale 1:15 840

0 ¼ ½ ¾ 1

0 1 000 2 000 3 000 4 000 5 000

This map is compiled on 1973 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

ROCK ISLAND COUNTY, ILLINOIS NO. 25

ROCK ISLAND COUNTY, ILLINOIS — SHEET NUMBER 26

26

N

1 Mile

5 000 Feet

R. 1 W. | R. 1 E.

(Joins sheet 20)

435 000 FEET

1 770 000 FEET

T. 18 N.

(Joins sheet 25)

1 765 000 FEET

420 000 FEET

(Joins sheet 27)

(Joins sheet 32)

SCOTT COUNTY — IOWA

MISSISSIPPI RIVER

EAST MOLINE

SILVIS

CUT AND FILL LAND

ST. PAUL AND PACIFIC

MILWAUKEE CHICAGO BURLINGTON NORTHERN

ROCK ISLAND AND PACIFIC

NORTHERN BURLINGTON

STATE HOSPITAL CEMETERY

ST. MARY CEMETERY

BORROW PIT

water

C.F.L.

25 30 29 35 36 31 32

Scale 1:15 840

0 ¼ ½ ¾ 1

1 000 2 000 3 000 4 000 5 000

This map is compiled on 1973 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

ROCK ISLAND COUNTY, ILLINOIS NO. 26

ROCK ISLAND COUNTY, ILLINOIS — SHEET NUMBER 27

N

1 Mile

5 000 Feet

Scale 1:15 840

ROCK ISLAND COUNTY, ILLINOIS NO. 27

This map is compiled on 1973 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

(Joins sheet 21)

1 770 000 FEET

440 000 FEET

R. 1 E.

T. 18 N.

(Joins sheet 26)

(Joins sheet 28)

(Joins sheet 33)

1 760 000 FEET

455 000 FEET

BORROW PIT

CUT AND FILL LAND

BURLINGTON NORTHERN

C.F.L.

CHICAGO ROCK ISLAND AND PACIFIC

Barstow

HOMELAND CEMETERY

Carbon Cliff

ROCK RIVER

HENRY COUNTY

Zuma Creek

water

28

27

26

25

36

35

34

33

28

N

1 Mile

5 000 Feet

R. 1 E. | R. 2 E.

(Joins sheet 22)

475 000 FEET

1 770 000 FEET

(Joins inset)

T. 18 N.

(Joins sheet 27)

1 760 000 FEET

460 000 FEET

Osborn

NORTHERN

BURLINGTON

ROCK RIVER

HENRY COUNTY

25 30 29 28 27 36 31

(Joins sheet 23)

481 000 FEET

1 768 000 FEET

476 000 FEET

(Joins upper right)

2000 AND 5000-FOOT GRID TICKS

Scale 1:15 840

0 0

¼ 1 000

½ 2 000

¾ 4 000

1 5 000

This map is compiled on 1973 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

ROCK ISLAND COUNTY, ILLINOIS SHEET NO. 28

This map is compiled on 1973 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

ROCK ISLAND COUNTY, ILLINOIS NO. 29

29

N

1 Mile

5 000 Feet

Scale 1:15 840

0 0

¼ 1 000

½ 2 000

¾ 3 000

1 4 000

1¼ 5 000

365 000 FEET

1 760 000 FEET

R. 2 W.

(Joins inset, sheet 24)

T. 17 N.

1 755 000 FEET

380 000 FEET

(Joins sheet 30)

(Joins sheet 36)

RIVER

MISSISSIPPI

SCOTT COUNTY IOWA

ROCK RIVER

ILLINOIS AND MISSISSIPPI CANAL

LOCK NO 32

Potter Island

Pettifer Island

Turkey Island

Lake

CUT AND FILL LAND

BORROW PIT

C.F.L.

C.R.I.&P.

G.P.

water

3

4

8

9

10

718

764A

W76

76

82

455

400

347

88B

107

765A

199

280

30

N

1 Mile

5 000 Feet

Scale 1:15 840

0 0

1/4 1 000

1/2 2 000

3/4 3 000

1 4 000

1 1/4 5 000

(Joins sheet 24)

(Joins sheet 29)

(Joins sheet 37)

(Joins sheet 31)

R. 2 W. | R. 1 W.

T. 17 N.

400 000 FEET

1 760 000 FEET

1 755 000 FEET

385 000 FEET

ROCK ISLAND (county seat)

MOLINE

CUT AND FILL LAND

CHICAGO, ROCK ISLAND AND PACIFIC

ROCK ISLAND

BORROW PIT

ST MARY CEMETERY

C.F.L.

B.P.

water

Turkey Is

W16

67

199

76

764

764A

87A

88B

430A

960F

280B

280D2

280C2

274B

274E2

960E2

19E

19F

455

415

945F

430B

1

2

3

6

7

10

11

12

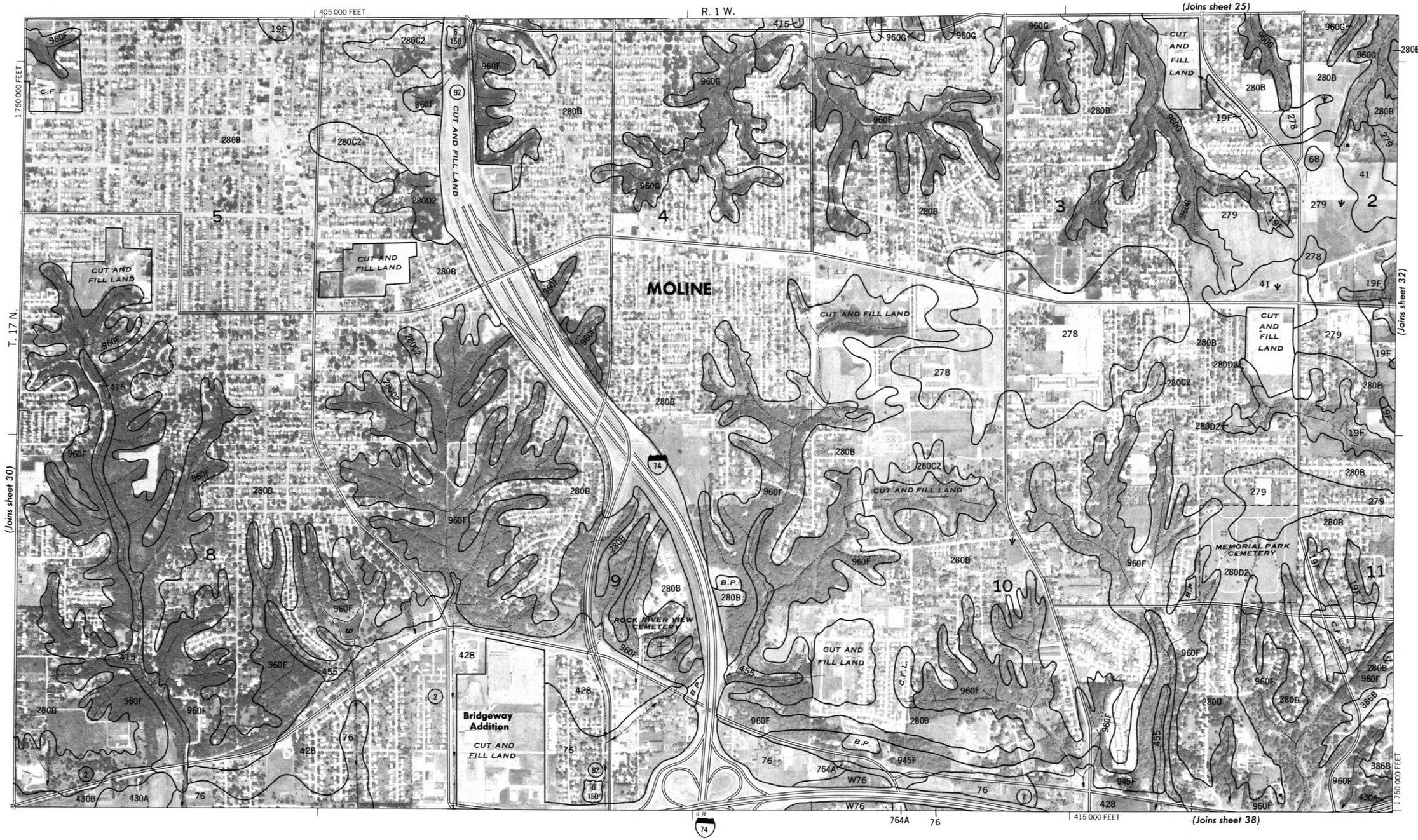
This map is compiled on 1973 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

ROCK ISLAND COUNTY, ILLINOIS NO. 30

2

ROCK ISLAND COUNTY, ILLINOIS NO. 31

This map is compiled on 1973 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.



31

N

1 Mile

5 000 Feet

Scale 1:15 840

0 ¼ ½ ¾ 1

1 000 2 000 3 000 4 000 5 000

ROCK ISLAND COUNTY, ILLINOIS — SHEET NUMBER 32

32

N

1 Mile

5 000 Feet

Scale 1:15 840

0 ¼ ½ ¾ 1

1 000 2 000 3 000 4 000 5 000

R. 1 W. | R. 1 E.

T. 17 N.

(Joins sheet 26)

(Joins sheet 31)

(Joins sheet 33)

(Joins sheet 39)

1 750 000 FEET

420 000 FEET

1 435 000 FEET

1 760 000 FEET

EAST MOLINE

SILVIS

CUT AND FILL LAND

CUT AND FILL LAND

GREENVIEW MEMORIAL GARDENS CEMETERY

ROSE LAWN CEMETERY

BOWLESBURG CEMETERY

water

C.F.L.

B.P.

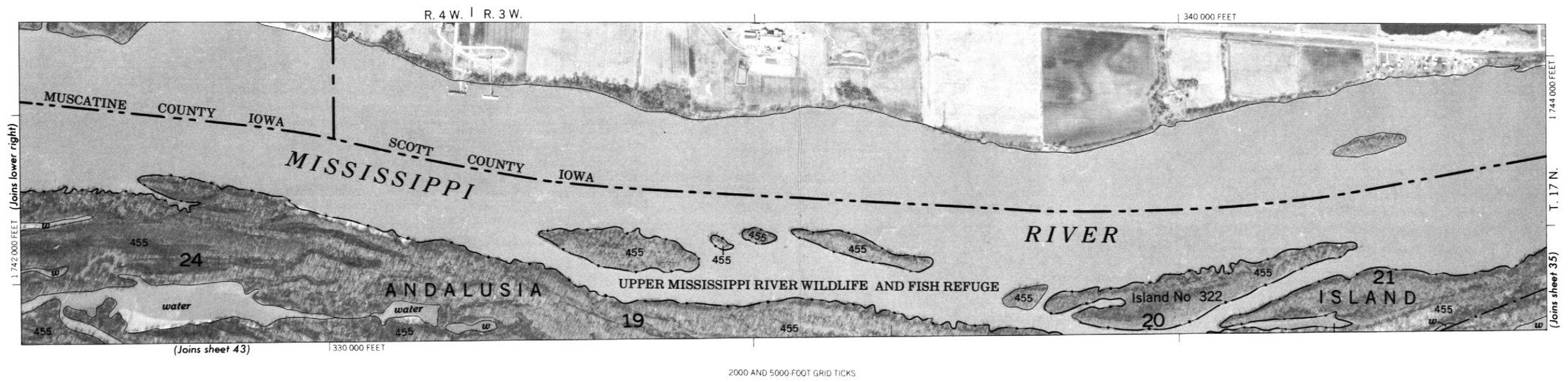
This map is compiled on 1973 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

ILLINOIS NO. 32

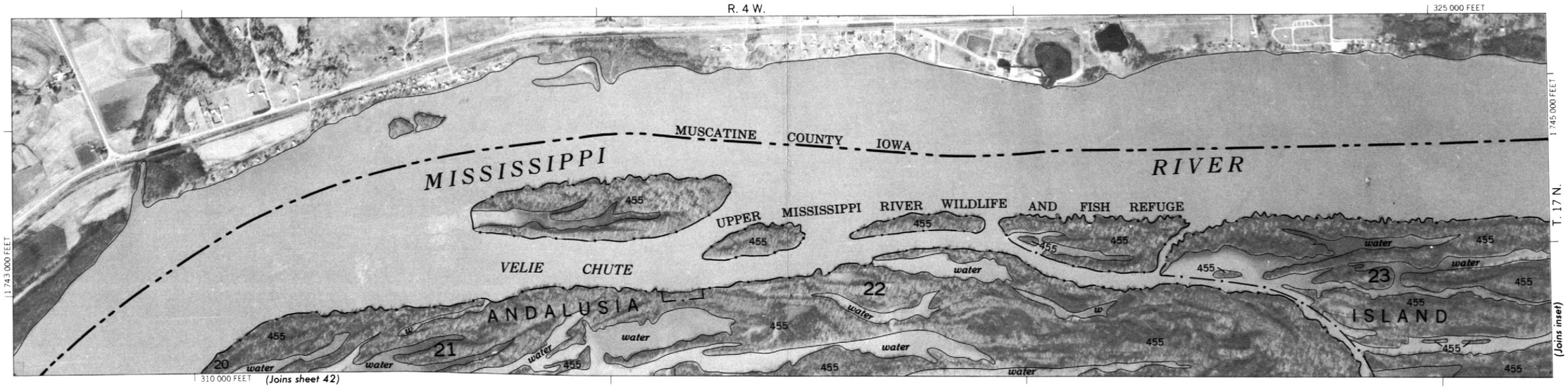
ROCK ISLAND COUNTY, ILLINOIS

ROCK ISLAND COUNTY, ILLINOIS NO. 33

This map is compiled on 1973 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



2000 AND 5000-FOOT GRID TICKS



2000 AND 5000-FOOT GRID TICKS

Scale 1:15 840

1 Mile
5 000 Feet

This map is compiled on 1973 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

ROCK ISLAND COUNTY, ILLINOIS NO. 34

ROCK ISLAND COUNTY, ILLINOIS NO. 35

This map is compiled on 1973 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

35

N

345 000 FEET

R. 3 W.

1 750 000 FEET

SCOTT COUNTY IOWA

MISSISSIPPI RIVER

Island No 319

Island No 317

UPPER MISSISSIPPI RIVER WILDLIFE AND FISH REFUGE

ANDALUSIA ISLAND

ANDALUSIA SLOUGH

21

22

23

24

T. 17 N.

1 745 000 FEET

(Joins inset, sheet 34)

(Joins sheet 36)

(Joins sheet 44)

360 000 FEET

945G

107

water

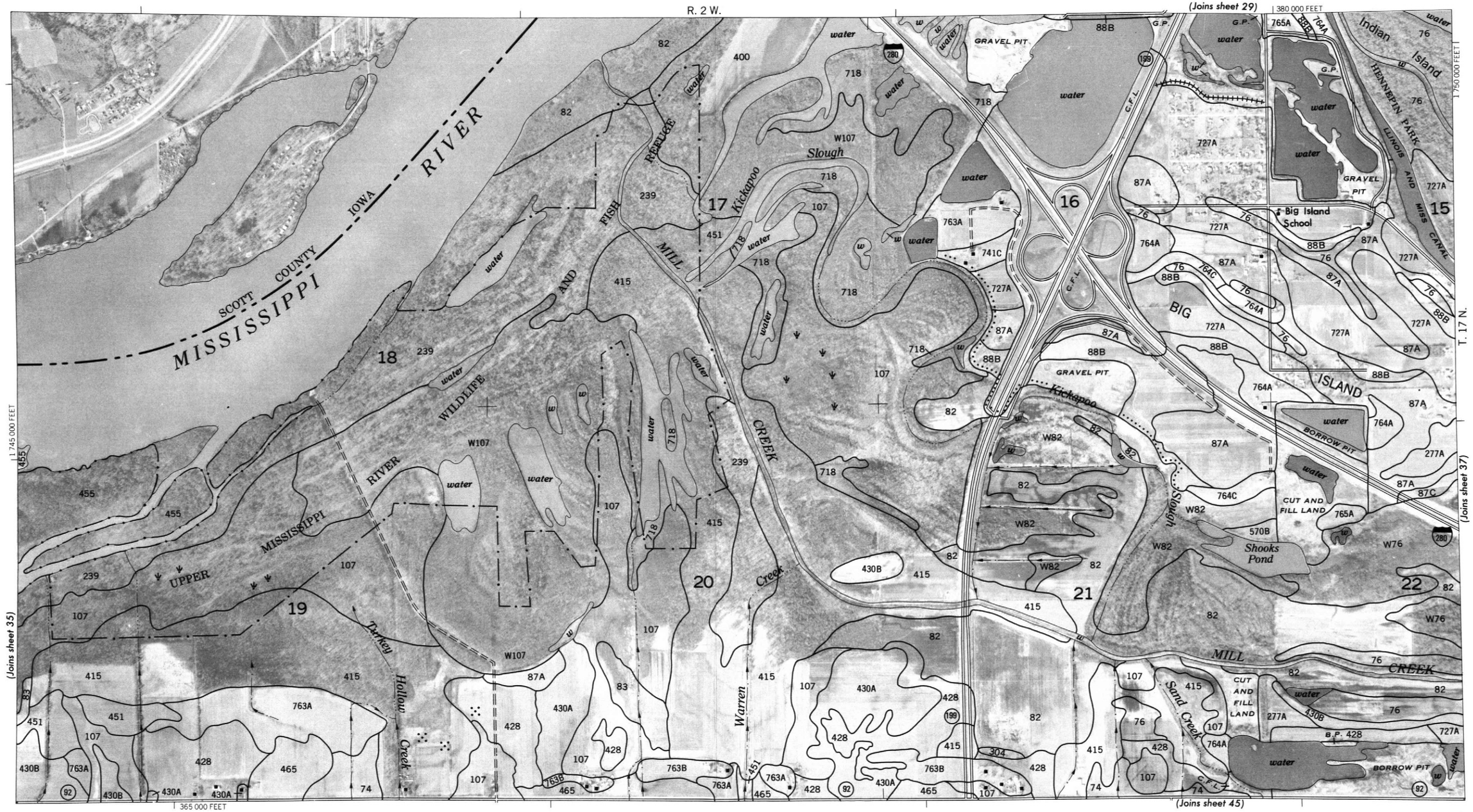
455 718 239 107 83 451 415 430A 430B 428 763A 570B 317 V506A

1 Mile

5 000 Feet

Scale 1:15 840

0 ¼ ½ ¾ 1 1 000 2 000 3 000 4 000 5 000



1 Mile
5 000 Feet
Scale 1:15 840
0 0
¼ 1 000
½ 2 000
¾ 4 000
1 5 000

This map is compiled on 1973 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

ROCK ISLAND COUNTY, ILLINOIS NO. 36

ROCK ISLAND COUNTY, ILLINOIS — SHEET NUMBER 37

37

N

1 Mile

5 000 Feet

Scale 1:15 840

0 1 000 ¼ 2 000 ½ 3 000 ¾ 4 000 1 5 000

ROCK ISLAND COUNTY, ILLINOIS NO. 37

W76 | 385 000 FEET | R. 2 W. | R. 1 W. | (Joins sheet 30)

1 750 000 FEET | T. 17 N.

(Joins sheet 36) | (Joins sheet 38) | (Joins sheet 46) | 400 000 FEET | 1 740 000 FEET

ROCK RIVER | Indian Island | HENNEPIN | ILLINOIS AND MISSISSIPPI CANAL PARK | BLACK HAWK STATE PARK | BORROW PIT | ROCK ISLAND C.F.L. | CHICAGO, ROCK ISLAND & PACIFIC R.R. | C.F.L. | VANDRUFF QUARRY | ISLAND | Carr Island | LOCK NO 30 | CANAL | water | MISSISSIPPI water | Mill Creek | Jimmy Creek | Kyle Creek | Case Creek | MILAN | C R I & P | BORROW PIT

15 | 14 | 13 | 18 | 22 | 23 | 24 | 19

ROCK ISLAND COUNTY, ILLINOIS — SHEET NUMBER 38

38

N

1 Mile

5 000 Feet

(Joins sheet 31)

R. 1 W.

415 000 FEET

960F

430A

T. 17 N.

1 745 000 FEET

(Joins sheet 37)

(Joins sheet 39)

1 740 000 FEET

405 000 FEET

(Joins sheet 47)

Fruitland

CUT AND FILL LAND

RIVER

ROCK

QUAD CITY AIRPORT

CUT AND FILL LAND

Coal Creek

16

17

15

14

20

21

22

23

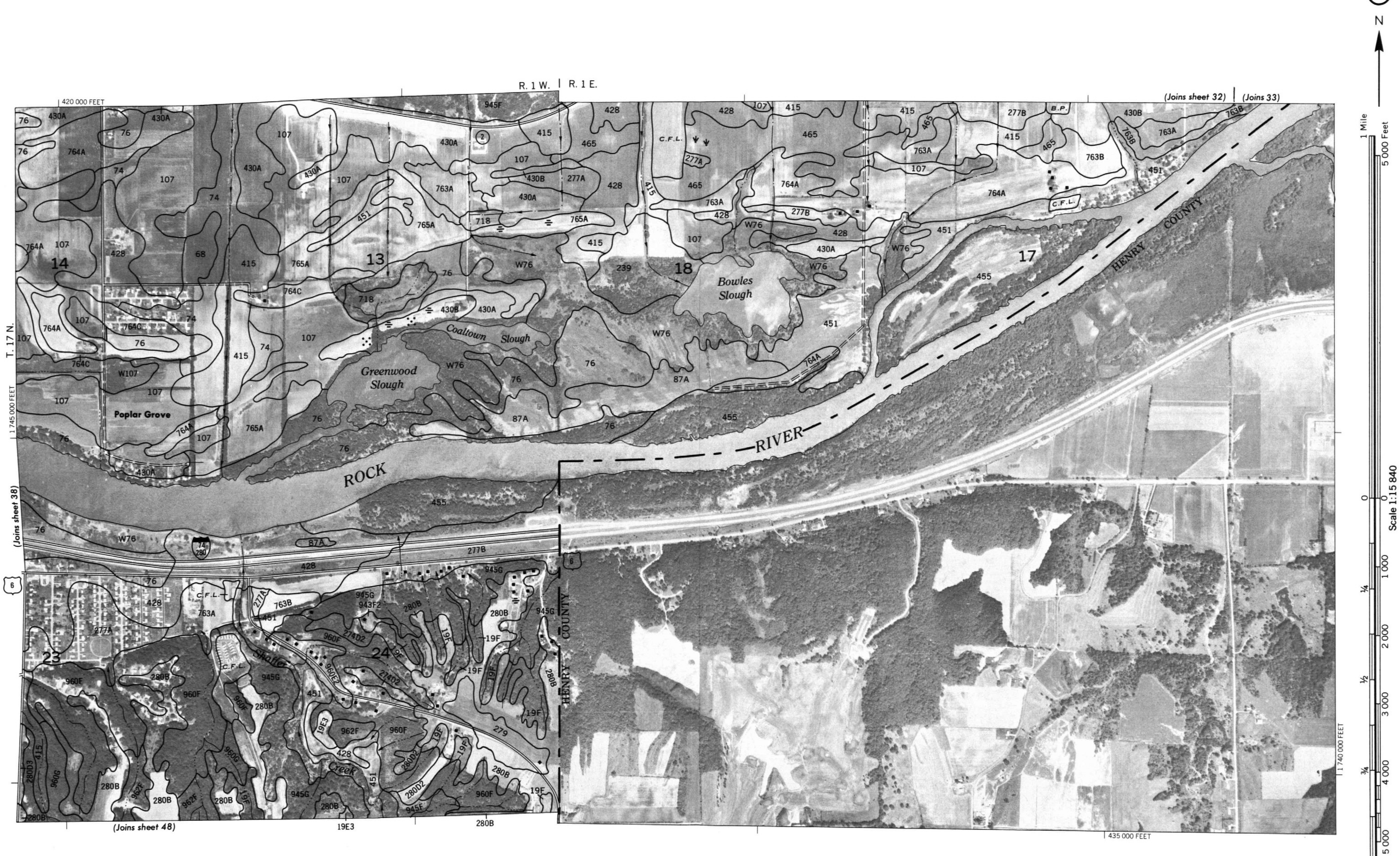
Scale 1:15 840

0 0 1/4 1 000 2 000 1/2 3 000 3/4 4 000 1 5 000

This map is compiled on 1973 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

ILLINOIS NO. 38

ROCK ISLAND COUNTY, ILLINOIS



This map is compiled on 1973 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

40

N

1 Mile

5 000 Feet

R. 6 W. | R. 5 W.

270 000 FEET

1 735 000 FEET

T. 17 N.

(Joins lower left)

LOCK AND DAM NO. 16

MUSCATINE COUNTY IOWA

MISSISSIPPI RIVER

1 733 000 FEET

92

455

36

428

107

265 000 FEET

(Joins sheet 49)

76

415

31

W76

82

239

2000 AND 5000-FOOT GRID TICKS

R. 5 W.

285 000 FEET

MISSISSIPPI RIVER

MUSCATINE COUNTY IOWA

Hershey Island

UPPER MISSISSIPPI RIVER WILDLIFE AND FISH REFUGE

1737 000 FEET

T. 17 N.

(Joins sheet 41)

Island No. 330

34

DRURY SLOUGH

UPPER MISSISSIPPI RIVER WILDLIFE AND FISH REFUGE

718

(Joins sheet 50)

(Joins inset)

1 733 000 FEET

451

Fourth Slough

304

32

33

275 000 FEET

4000 AND 5000-FOOT GRID TICKS

Scale 1:15 840

0 1 000 2 000 3 000 4 000 5 000

This map is compiled on 1973 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

ROCK ISLAND COUNTY, ILLINOIS NO. 40

ROCK ISLAND COUNTY, ILLINOIS — SHEET NUMBER 41

41

N

290 000 FEET

R. 5 W. | R. 4 W.

1 740 000 FEET

T. 17 N.

RIVER

Andalusia Island

30

29

FISH

REFUGE

AND

SLOUGH

ANDALUSIA

MISSISSIPPI

MUSCATINE COUNTY IOWA

Island No. 328

WILDLIFE

UPPER MISSISSIPPI RIVER

31

32

35

36

(Joins sheet 42)

(Joins sheet 40)

(Joins sheet 51)

1 735 000 FEET

305 000 FEET

455 718 415 239 107 83 W76 428 451 945E2 945F 960F 280C2 280D2 280B 945G 764C 577 76

1 Mile

5 000 Feet

Scale 1:15 840

0 ¼ ½ ¾ 1

0 1 000 2 000 3 000 4 000 5 000

ROCK ISLAND COUNTY, ILLINOIS NO. 41

This map is compiled on 1973 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

This map is compiled on 1973 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

ROCK ISLAND COUNTY, ILLINOIS NO. 42

This map is compiled on 1973 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

ROCK ISLAND COUNTY, ILLINOIS NO. 43

330 000 FEET

R. 4 W. | R. 3 W.

1 740 000 FEET

T. 17 N.

(Joins inset, sheet 34)

ANDALUSIA

UPPER MISSISSIPPI RIVER WILDLIFE AND FISH REFUGE

ANDALUSIA SLOUGH

ISLAND

water

(Joins sheet 42)

(Joins sheet 44)

1 735 000 FEET

340 000 FEET

(Joins sheet 53) | (54)

N

1 Mile

5 000 Feet

Scale 1:15 840

ROCK ISLAND COUNTY, ILLINOIS — SHEET NUMBER 44

(44)

N

1 Mile

5 000 Feet

Scale 1:15 840

0 ¼ ½ ¾ 1

1 000 2 000 3 000 4 000 5 000

(Joins sheet 35), W

R. 3 W.

360 000 FEET

1 740 000 FEET

T. 17 N.

(Joins sheet 43)

(Joins sheet 45)

(Joins sheet 54)

345 000 FEET

1 735 000 FEET

ANDALUSIA SLOUGH

Andalusia

Hills

Creek

Fancy Creek

C.F.I.

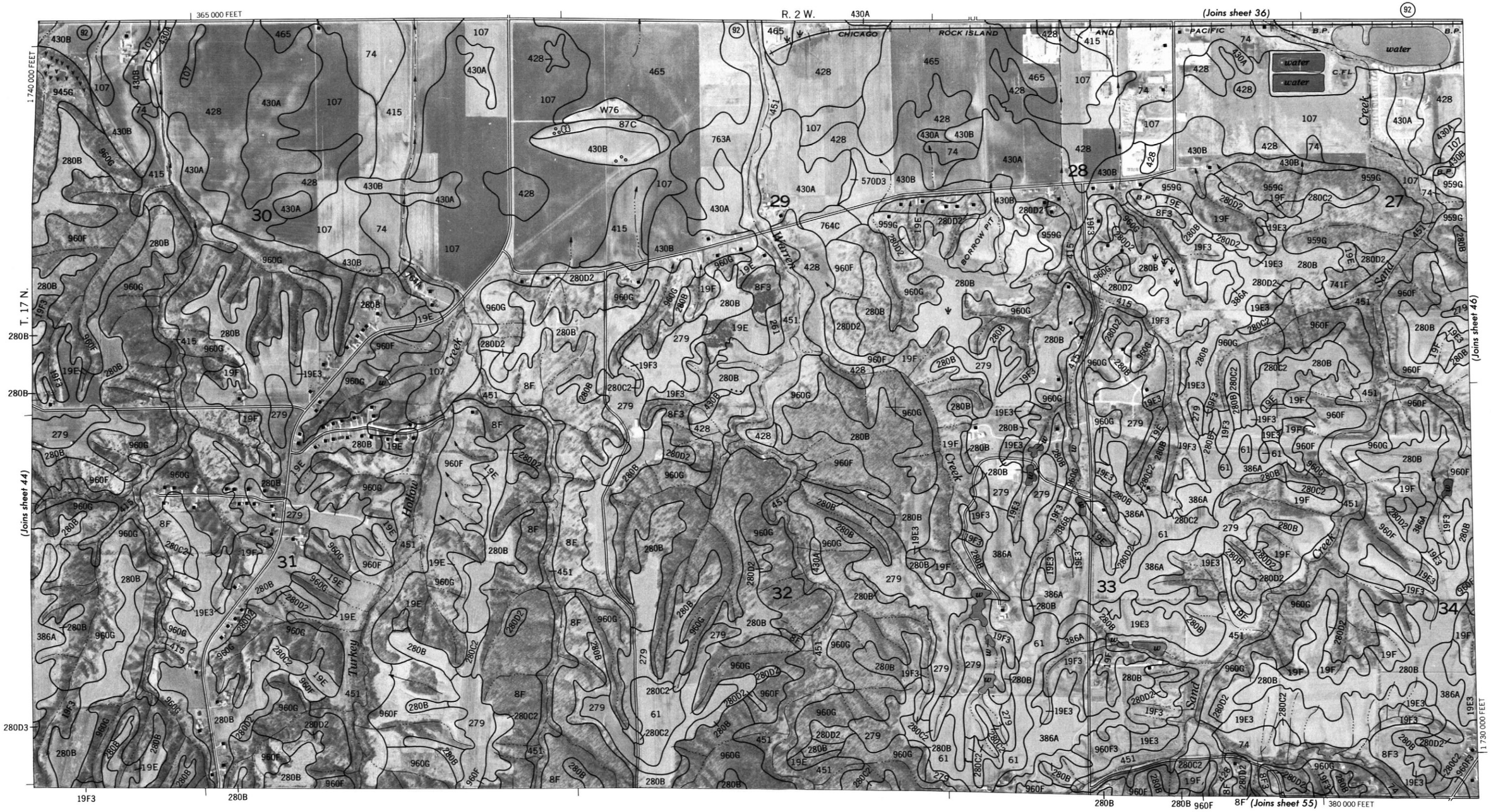
28 27 26 25 33 34 35 36

This map is compiled on 1973 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

ROCK ISLAND COUNTY, ILLINOIS NO. 44

ROCK ISLAND COUNTY, ILLINOIS NO. 45

This map is compiled on 1973 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned:



45

N

1 Mile

5 000 Feet

Scale 1:15 840

ROCK ISLAND COUNTY, ILLINOIS — SHEET NUMBER 46

46

N

1 Mile

5 000 Feet

Scale 1:15 840

0 ¼ ½ ¾ 1

1 000 2 000 3 000 4 000 5 000

(92) B.P. CHICAGO CUT AND FILL LAND ROCK ISLAND AND PACIFIC

(92)

R. 2 W. | R. 1 W.

(Joins sheet 37)

400 000 FEET

T. 17 N.

1 735 000 FEET

(Joins sheet 45)

1 730 000 FEET

385 000 FEET

(Joins sheet 47)

(Joins sheet 56) | (57)

C.F.L.

Ginger Hill

Oak Grove

QUARRY

MILL CREEK

Kyle Creek

Stretton Creek

Case Creek

Mill Creek

CUT AND FILL LAND

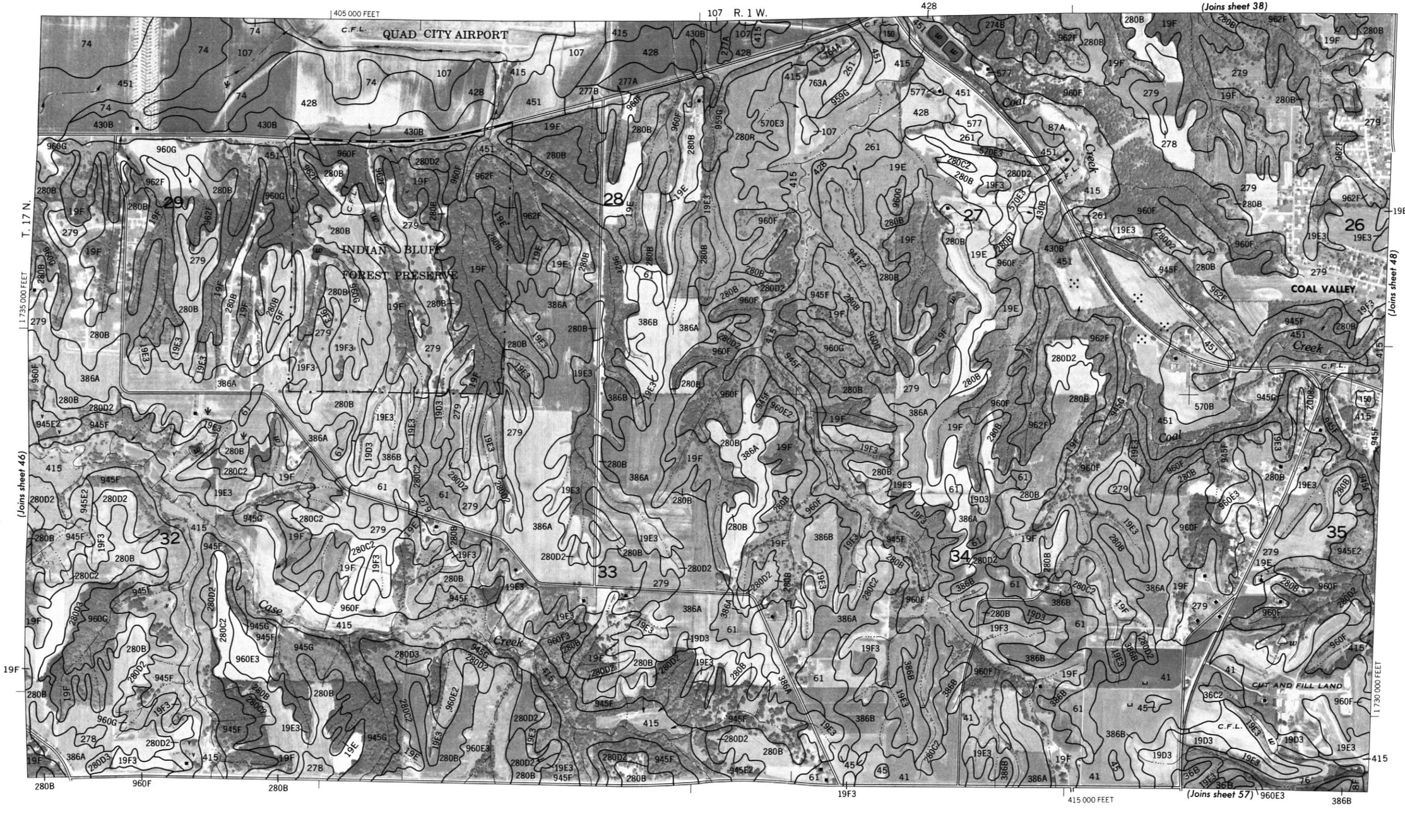
26 27 25 30 34 35 36 31

This map is compiled on 1973 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

ROCK ISLAND COUNTY, ILLINOIS NO. 46

ROCK ISLAND COUNTY, ILLINOIS NO. 47

This map is compiled on 1973 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.



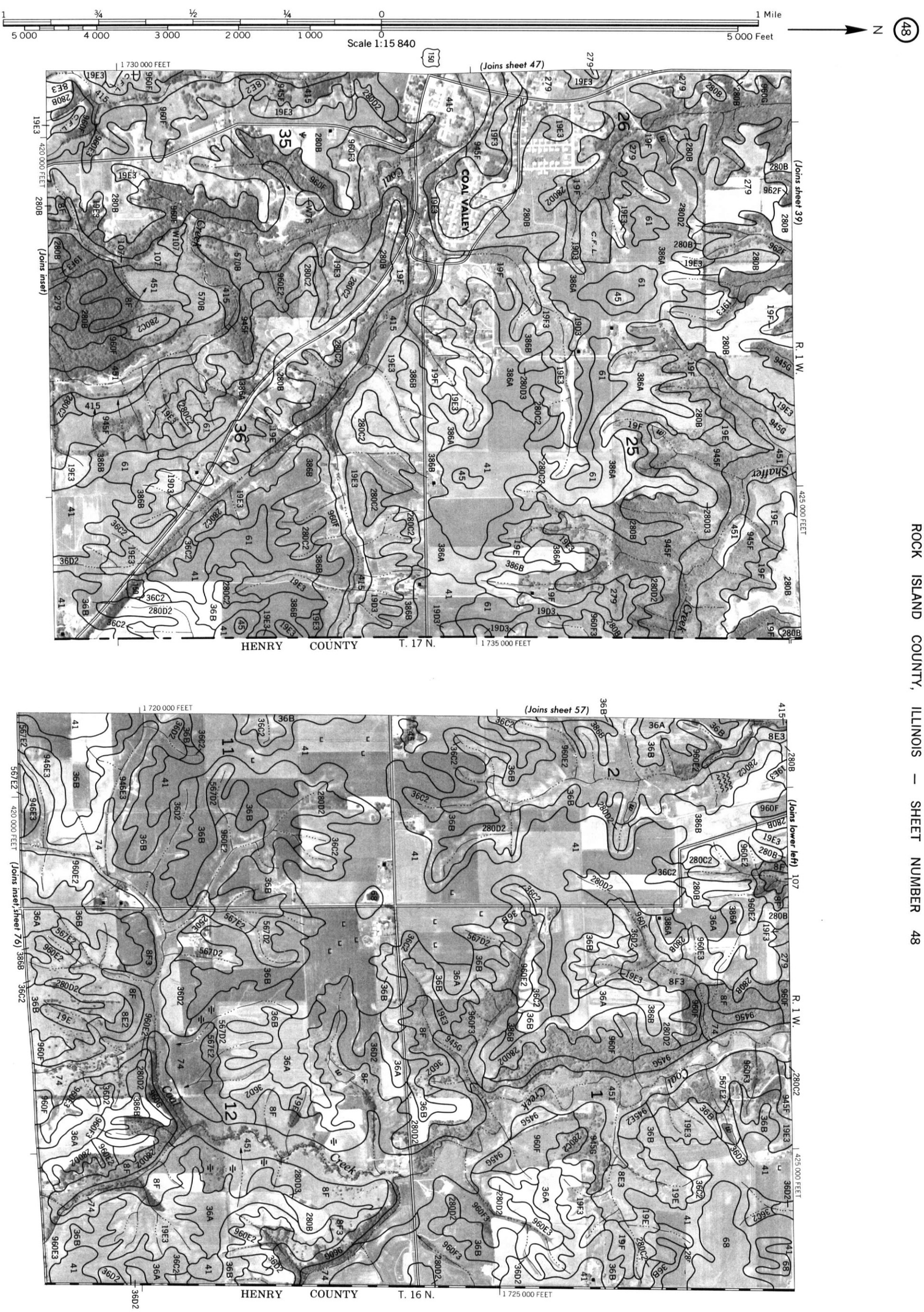
47

N

1 Mile

5 000 Feet

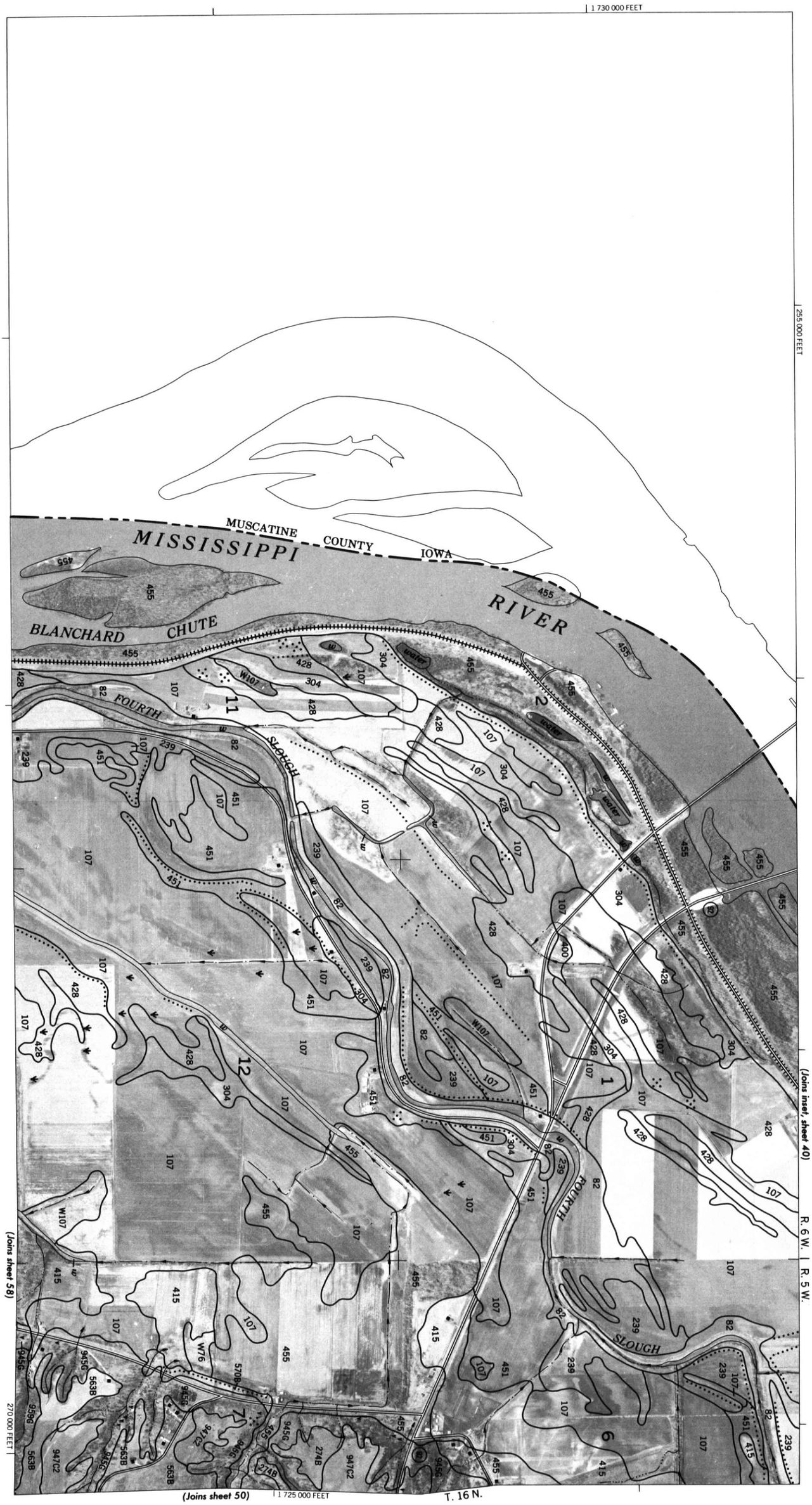
Scale 1:15 840



ROCK ISLAND COUNTY, ILLINOIS — SHEET NUMBER 48

This map is compiled on 1973 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

This map is compiled on 1973 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.



1 Mile
5 000 4 000 3 000 2 000 1 000 0 5 000 Feet
Scale 1:15 840

N

ROCK ISLAND COUNTY, ILLINOIS — SHEET NUMBER 50

50

N

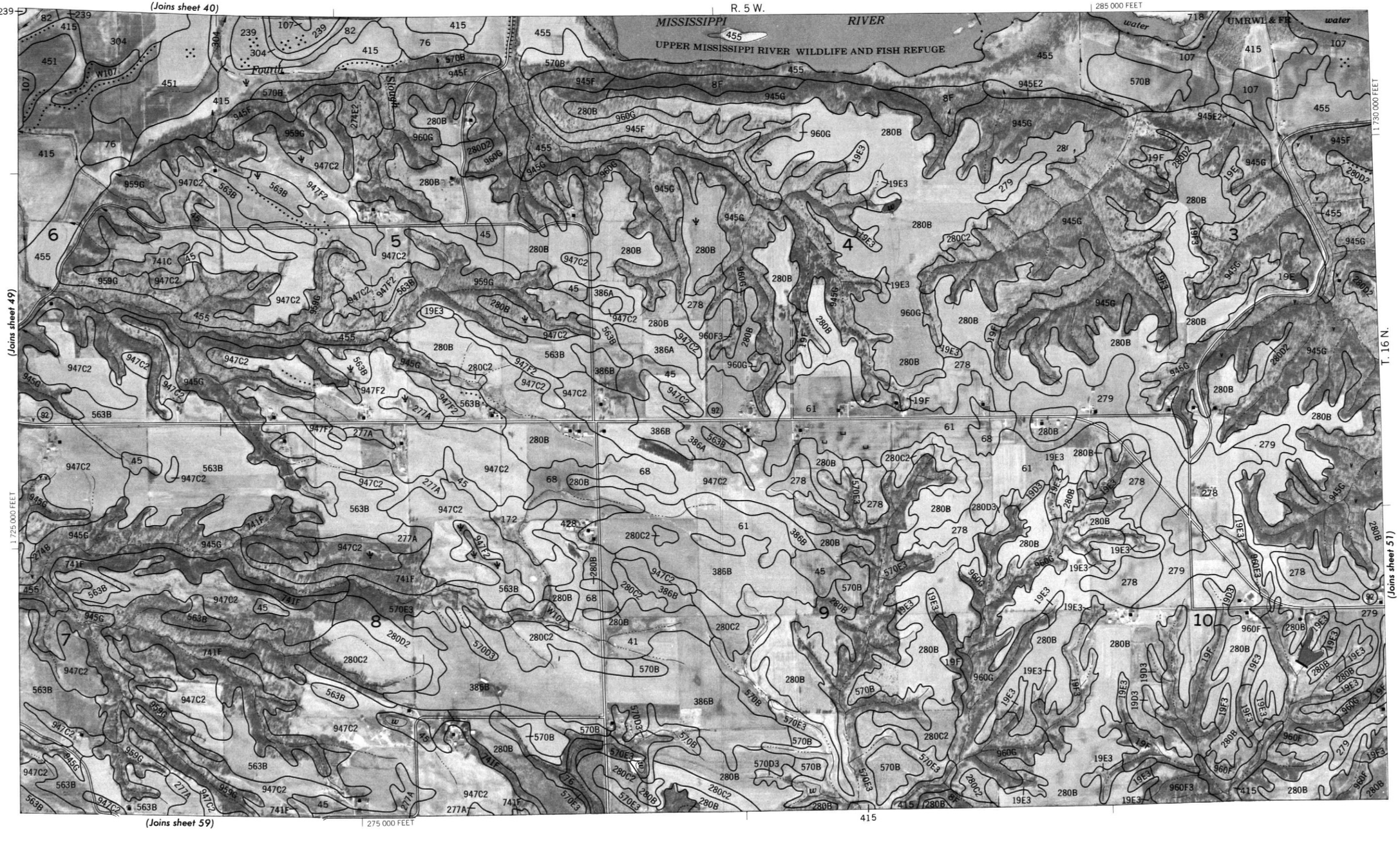
1 Mile

5 000 Feet

Scale 1:15 840

0 ¼ ½ ¾ 1

0 1 000 2 000 3 000 4 000 5 000



This map is compiled on 1973 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

ROCK ISLAND COUNTY, ILLINOIS NO. 50

ROCK ISLAND COUNTY, ILLINOIS NO. 51

This map is compiled on 1973 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

52

N

1 Mile

5 000 Feet

R. 4 W.

(Joins sheet 42)

325 000 FEET

1 730 000 FEET

LOUD THUNDER FOREST PRESERVE

T. 16 N.

(Joins sheet 53)

(Joins sheet 51)

1 725 000 FEET

310 000 FEET

(Joins sheet 61)

Zion Church

Scale 1:15 840

0 1 000 2 000 3 000 4 000 5 000

1/4 1/2 3/4 1

This map is compiled on 1973 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

ROCK ISLAND COUNTY, ILLINOIS NO. 52

ROCK ISLAND COUNTY, ILLINOIS — SHEET NUMBER 53

53

N

1 Mile

5 000 Feet

Scale 1:15 840

0 1/4 1/2 3/4 1

1 000 2 000 3 000 4 000 5 000

ROCK ISLAND COUNTY, ILLINOIS NO. 53

This map is compiled on 1973 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

(Joins sheet 43)

330 000 FEET

R. 4 W.

R. 3 W.

1 730 000 FEET

T. 16 N.

(Joins sheet 52)

(Joins sheet 62)

(Joins sheet 54)

1 720 000 FEET

340 000 FEET

Branch

Big

ROCK ISLAND COUNTY, ILLINOIS — SHEET NUMBER 54

54

N

(43) (Joins sheet 44)

R. 3 W.

360 000 FEET

1 730 000 FEET

T. 16 N.

(Joins sheet 53)

(Joins sheet 55)

345 000 FEET

1 720 000 FEET

(Joins sheet 63)

1 Mile

5 000 Feet

Scale 1:15 840

0 ¼ ½ ¾ 1

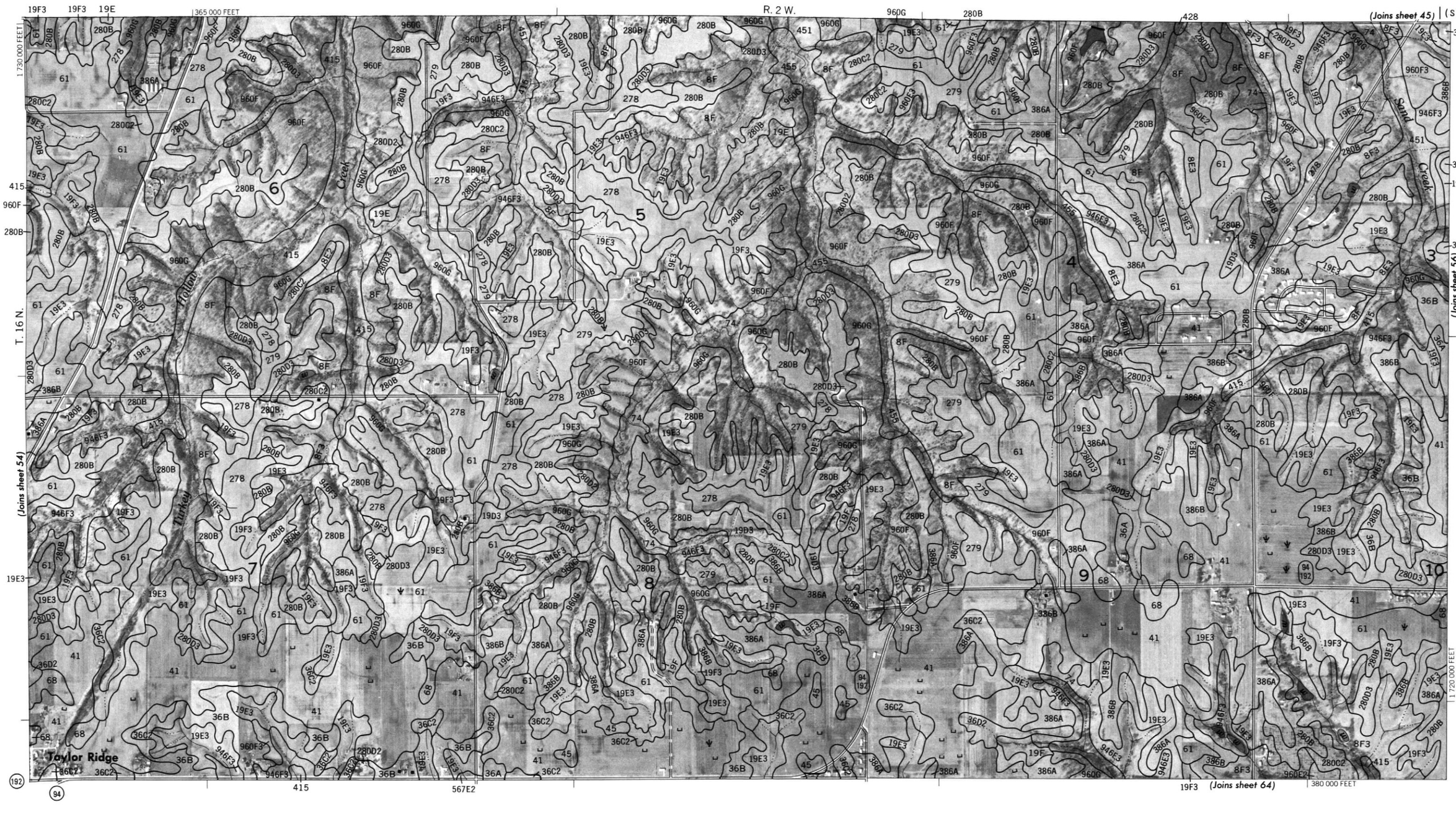
0 1 000 2 000 3 000 4 000 5 000

This map is compiled on 1973 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

ROCK ISLAND COUNTY, ILLINOIS NO. 54

ROCK ISLAND COUNTY, ILLINOIS NO. 55

This map is compiled on 1973 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.



ROCK ISLAND COUNTY, ILLINOIS — SHEET NUMBER 56

56

N

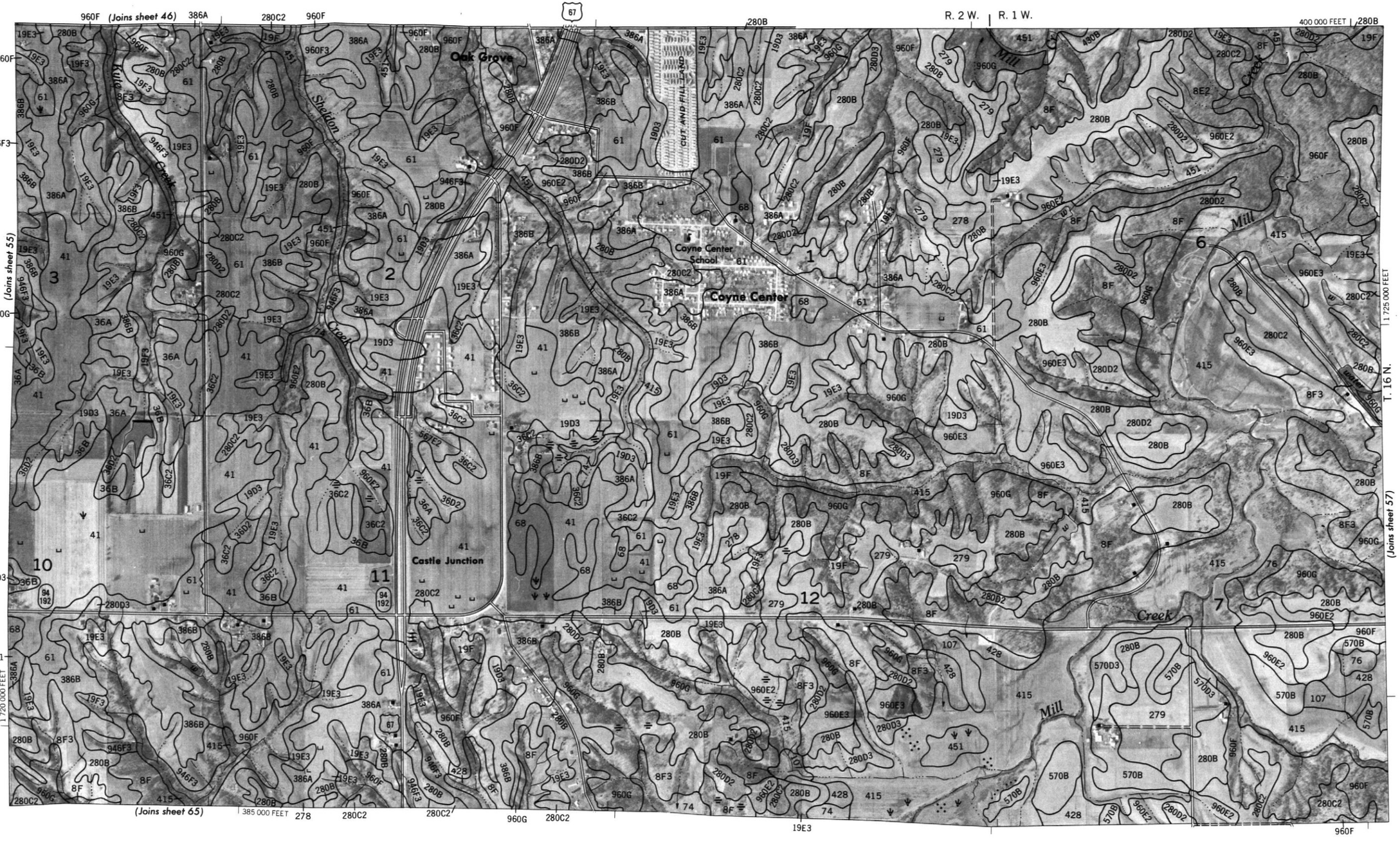
1 Mile

5 000 Feet

Scale 1:15 840

0 1/4 1/2 3/4 1

0 1 000 2 000 3 000 4 000 5 000



This map is compiled on 1973 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

ROCK ISLAND COUNTY, ILLINOIS NO. 56

ROCK ISLAND COUNTY, ILLINOIS — SHEET NUMBER 57

57

N

(46) | (Joins sheet 47)

405 000 FEET

415

R. 1 W.

T. 16 N.

1 725 000 FEET

(Joins sheet 56)

(Joins sheet 66)

(Joins inset, sheet 48)

1 720 000 FEET

415 000 FEET

Case Creek

1 Mile

5 000 Feet

Scale 1:15 840

0 1/4 1/2 3/4 1

0 1 000 2 000 3 000 4 000 5 000

This map is compiled on 1973 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

ROCK ISLAND COUNTY, ILLINOIS NO. 57

ROCK ISLAND COUNTY, ILLINOIS — SHEET NUMBER 58

58

N

1 Mile

5 000 Feet

Scale 1:15 840

1 715 000 FEET

255 000 FEET

82

(Joins sheet 49)

R. 6 W. | R. 5 W.

270 000 FEET

1 720 000 FEET

T. 16 N.

(Joins sheet 59)

(Joins sheet 67)

MISSISSIPPI RIVER

MUSCATINE COUNTY IOWA

CHUTE

FOURTH

ISLAND

BLANCHARD

BLANCHARD

MISSISSIPPI

UPPER

RIVER

WILDLIFE AND FISH REFUGE

water

COPPERAS CREEK

REYNOLDS CEMETERY

14

13

22

23

24

18

19

This map is compiled on 1973 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

ILLINOIS NO. 58

ROCK ISLAND COUNTY, ILLINOIS

59

ROCK ISLAND COUNTY, ILLINOIS NO. 59

T. 16 N.

R. 5 W.

275 000 FEET

1 720 000 FEET

285 000 FEET

1 715 000 FEET

(Joins sheet 50)
(Joins sheet 58)
(Joins sheet 60)
(Joins sheet 68)

Providence Church

COPPERAS CREEK

N

1 Mile

5 000 Feet

Scale 1:15 840

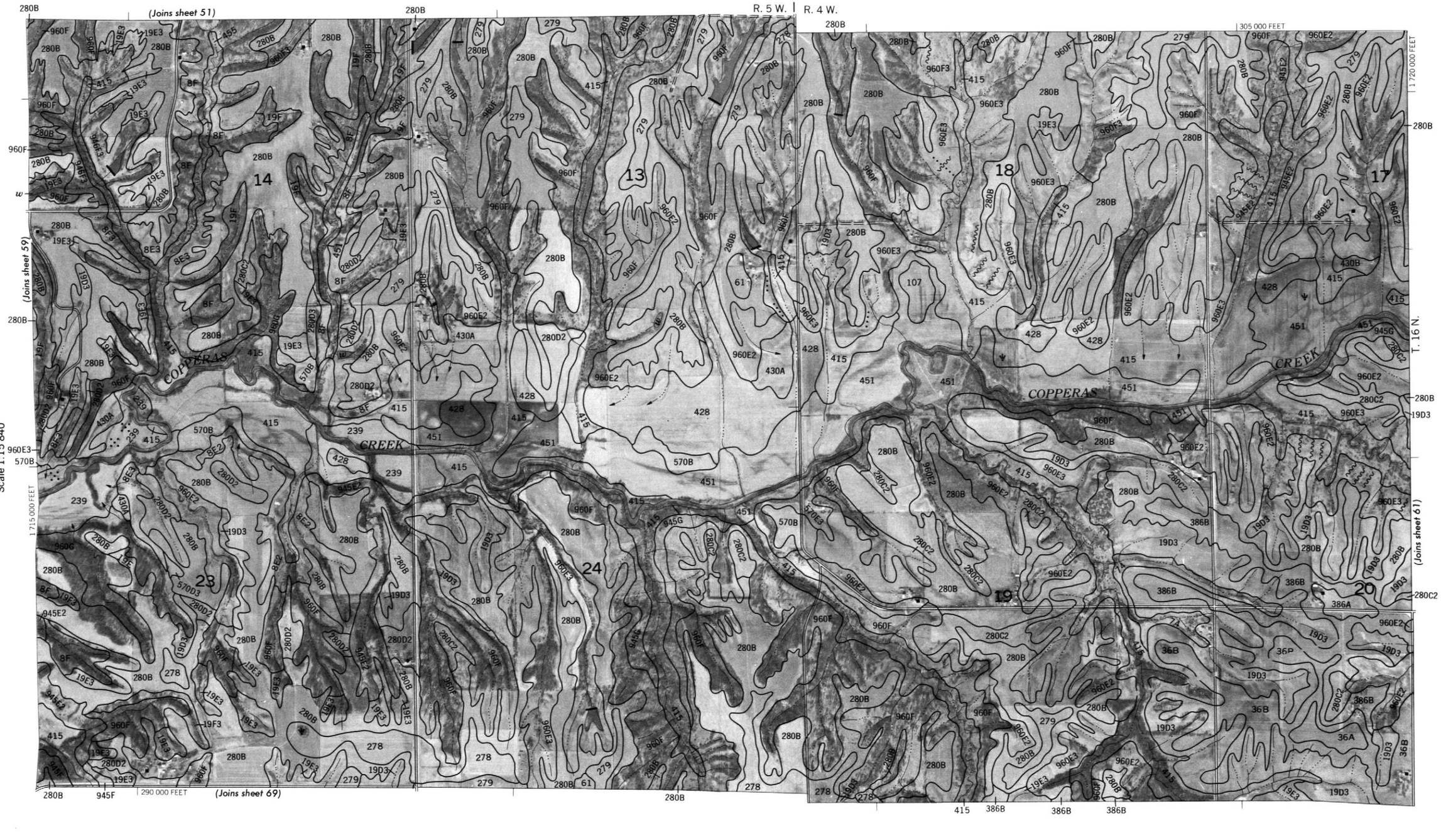
60

N

1 Mile

5 000 Feet

Scale 1:15 840



This map is compiled on 1973 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

ROCK ISLAND COUNTY, ILLINOIS NO. 60

ROCK ISLAND COUNTY, ILLINOIS NO. 61

This map is compiled on 1973 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

61

N

1 Mile

5 000 Feet

Scale 1:15 840

0 0 1 000 2 000 3 000 4 000 5 000

¼ ½ ¾

310 000 FEET

1 720 000 FEET

1 710 000 FEET

325 000 FEET

R. 4 W.

T. 16 N.

(Joins sheet 52)

(Joins sheet 62)

(Joins sheet 60)

(Joins sheet 70)

Buffalo Prairie

Zion Cemetery

COPPERAS CREEK

Coppers Creek

16

15

14

17

21

22

23

20

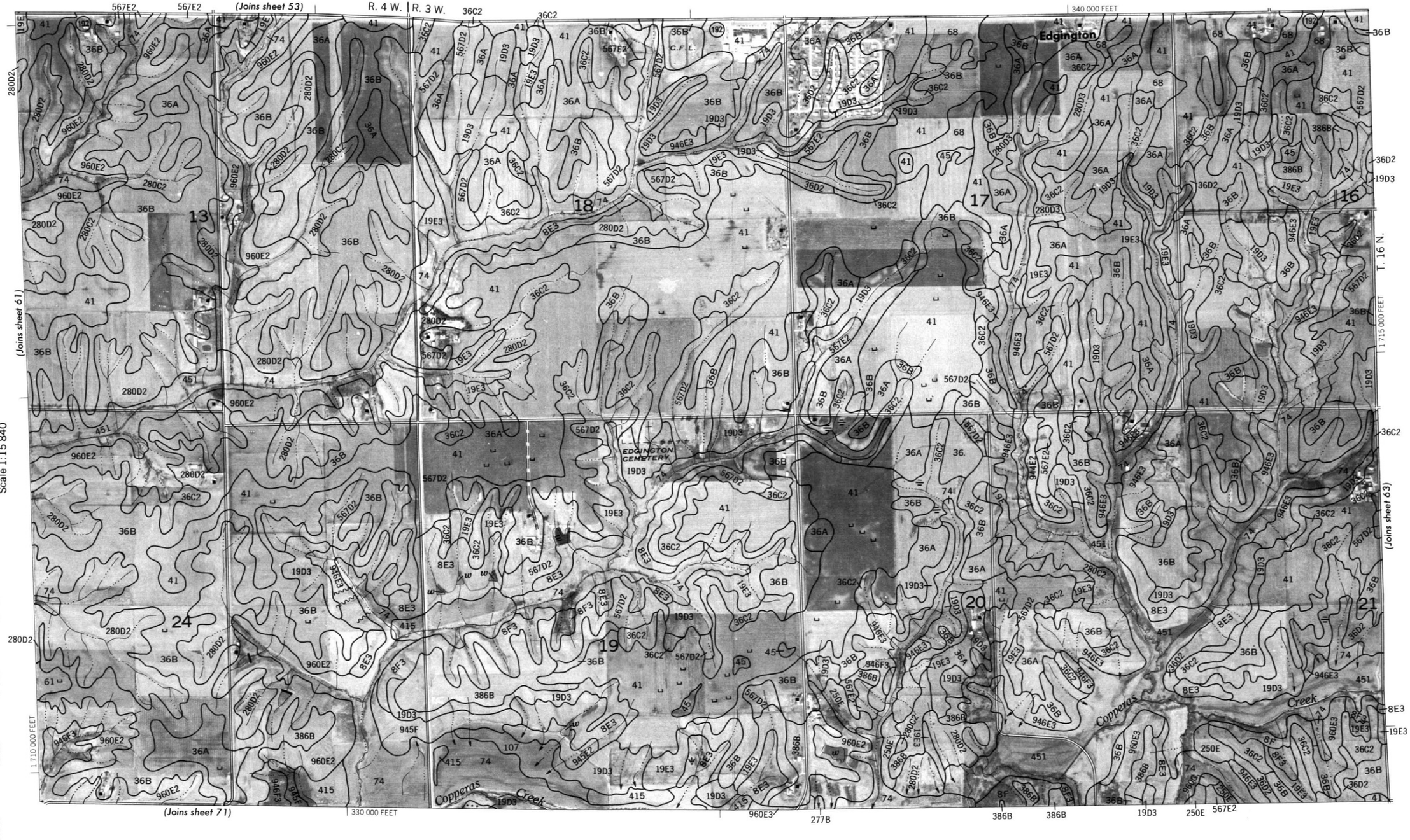
62

N

1 Mile

5 000 Feet

Scale 1:15 840



This map is compiled on 1973 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

ROCK ISLAND COUNTY, ILLINOIS NO. 62

ROCK ISLAND COUNTY, ILLINOIS — SHEET NUMBER 63

63

N

R. 3 W.

T. 16 N.

345 000 FEET

1 715 000 FEET

1 710 000 FEET

360 000 FEET

(Joins sheet 54)

(Joins sheet 62)

(Joins sheet 64)

(Joins sheet 72)

Copperas Creek

Mill Creek

1 Mile

5 000 Feet

Scale 1:15 840

ROCK ISLAND COUNTY, ILLINOIS NO. 63

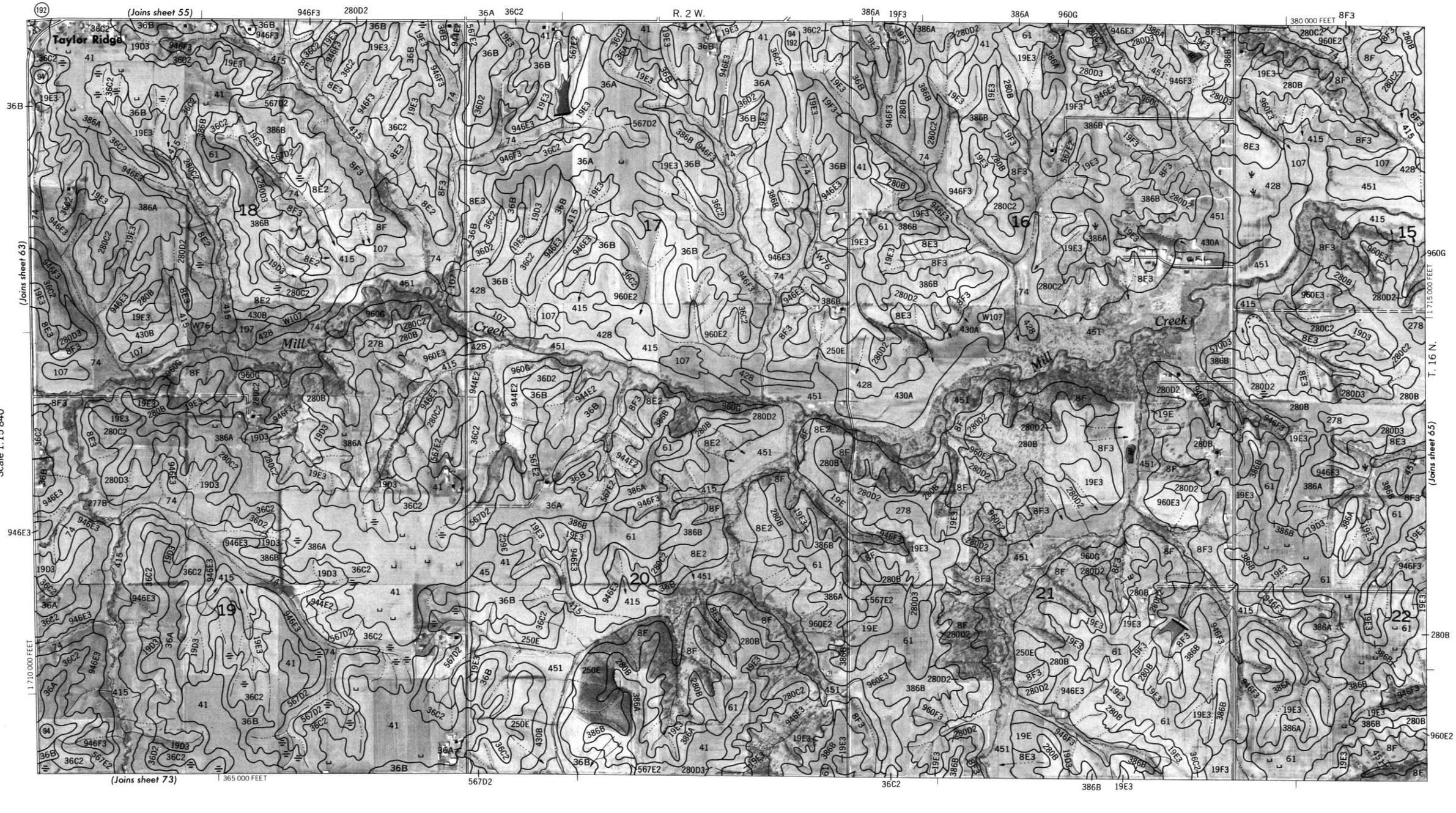
This map is compiled on 1973 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

N

1 Mile

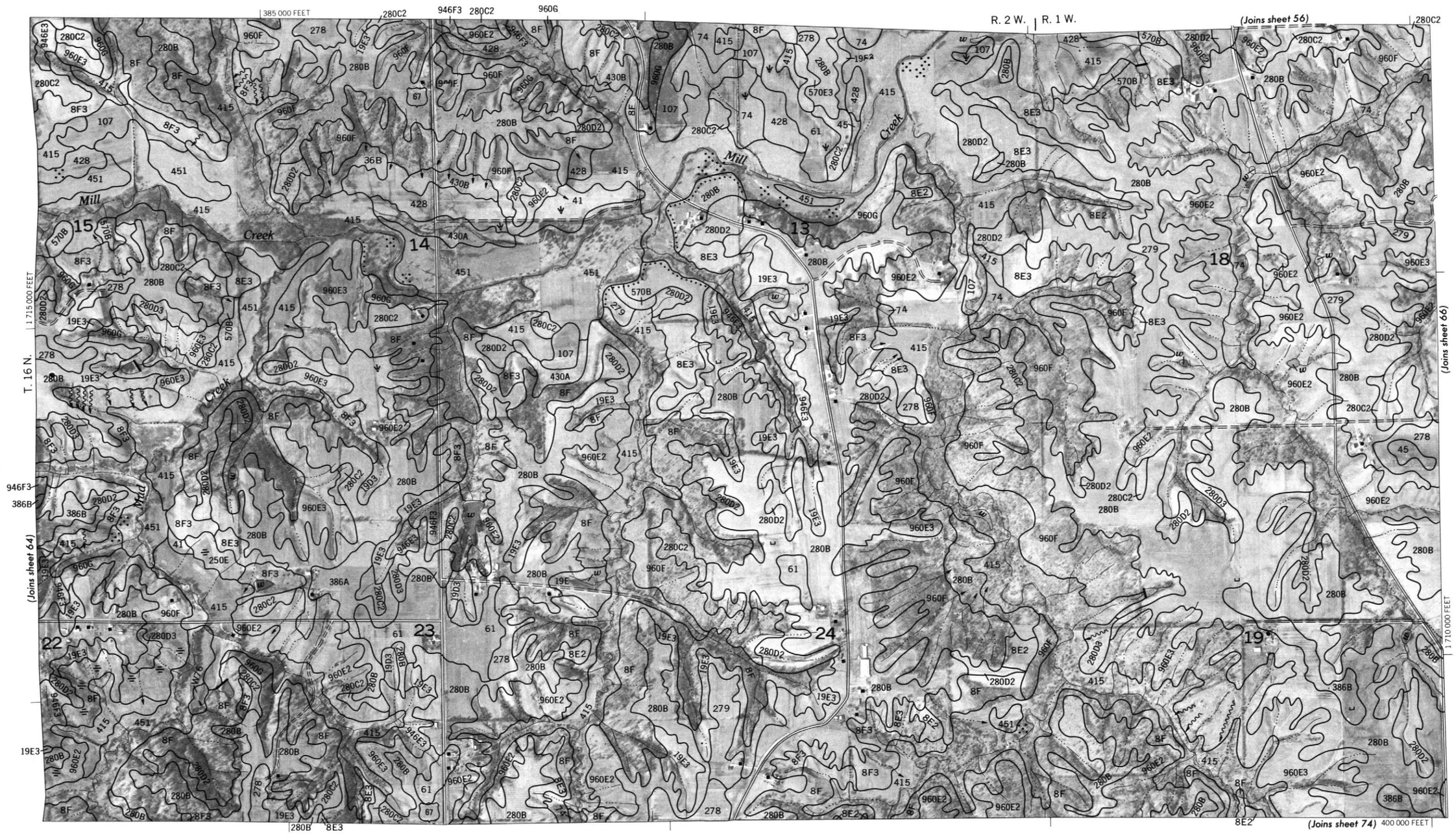
5 000 Feet

Scale 1:15 840



This map is compiled on 1973 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

ROCK ISLAND COUNTY, ILLINOIS NO. 64



ROCK ISLAND COUNTY, ILLINOIS — SHEET NUMBER 66

66

N

1 Mile

5 000 Feet

Scale 1:15 840

0 ¼ ½ ¾ 1

0 1 000 2 000 3 000 4 000 5 000

(Joins sheet 57)

R. 1 W.

415 000 FEET

1 715 000 FEET

T. 16 N.

(Joins sheet 65)

(Joins inset, sheet 76)

1 710 000 FEET

(Joins sheet 75)

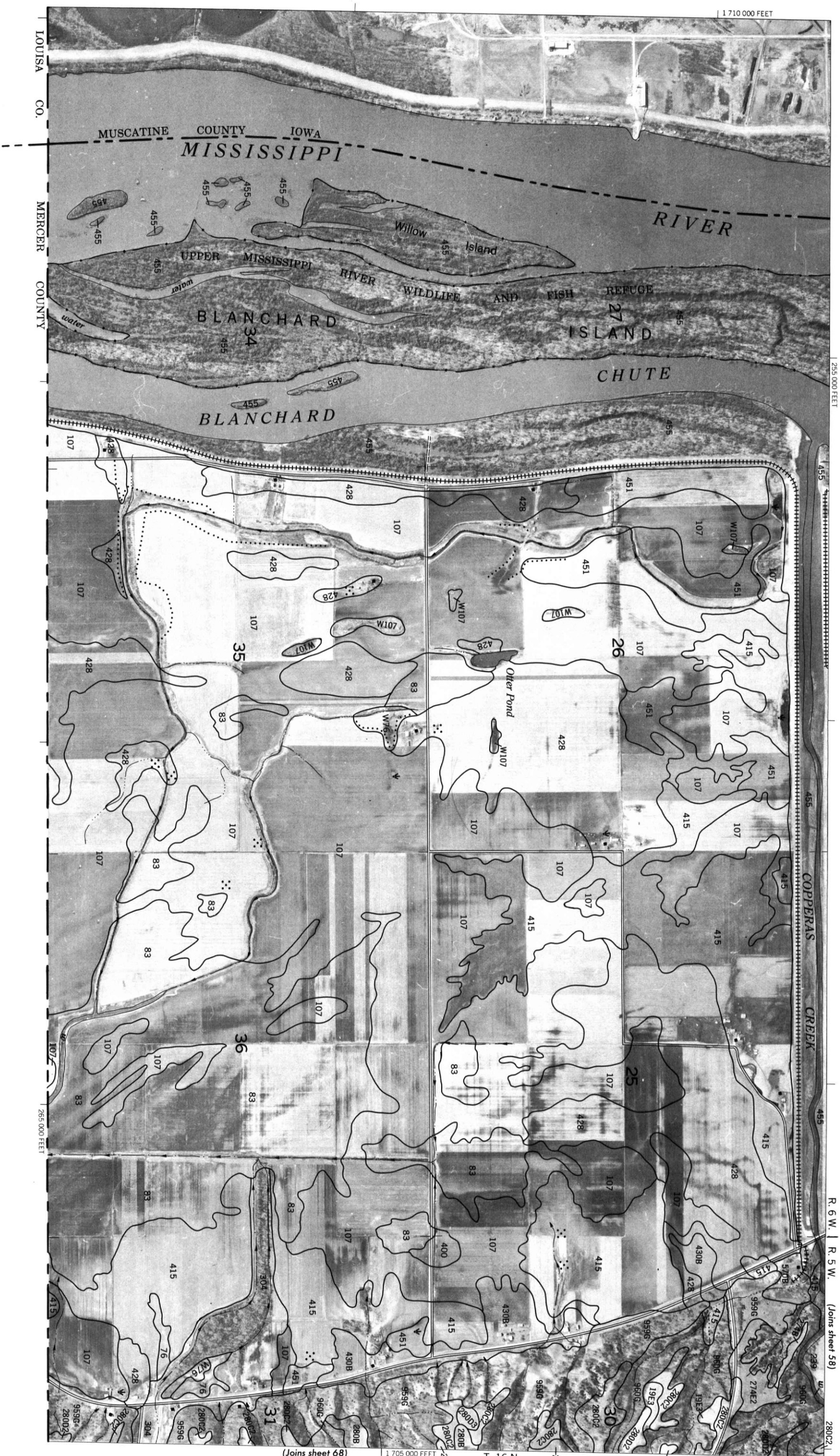
405 000 FEET

Beulah Church

This map is compiled on 1973 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

ROCK ISLAND COUNTY, ILLINOIS NO. 66

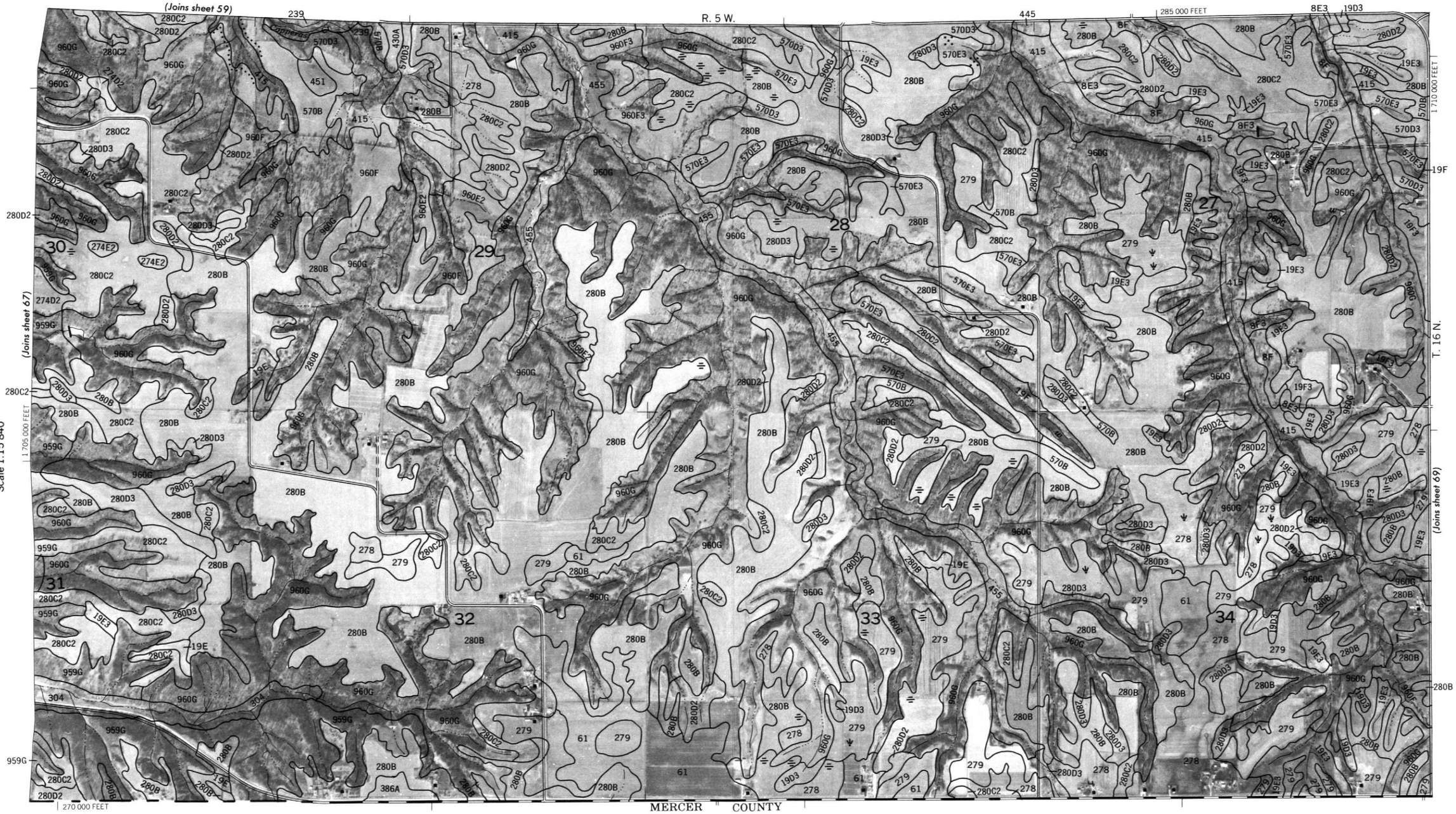
This map is compiled on 1973 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.



ROCK ISLAND COUNTY, ILLINOIS — SHEET NUMBER 67

1 Mile
5 000 4 000 3 000 2 000 1 000 0 5 000 Feet
Scale 1:15 840

N



This map is compiled on 1973 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

ROCK ISLAND COUNTY, ILLINOIS NO. 68

This map is compiled on 1973 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

69

N

1 Mile
5 000 Feet

Scale 1:15 840

0 ¼ ½ ¾ 1

1 000 2 000 3 000 4 000 5 000

R. 5 W. R. 4 W.

T. 16 N.

290 000 FEET

1 710 000 FEET

1 700 000 FEET

305 000 FEET

(Joins sheet 60)

(Joins sheet 68)

(Joins sheet 70)

MERCER COUNTY

BUFFALO PRAIRIE CEMETERY

70

N

1 Mile

5 000 Feet

Scale 1:15 840

0 ¼ ½ ¾ 1

1 000 2 000 3 000 4 000 5 000

R. 4 W.

T. 16 N.

325 000 FEET

1 705 000 FEET

1 700 000 FEET

310 000 FEET

(Joins sheet 61)

(Joins sheet 69)

(Joins sheet 71)

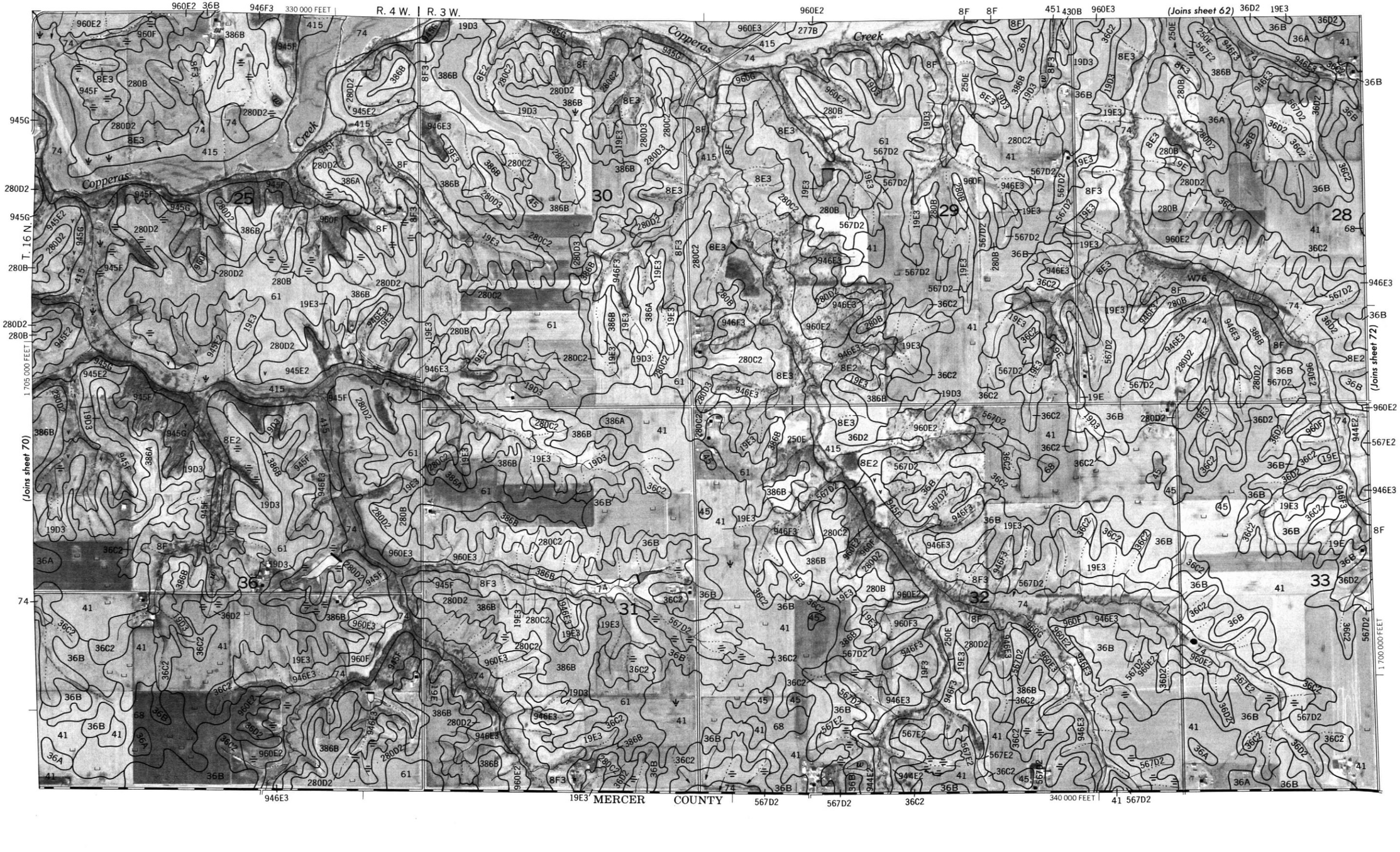
MERCER COUNTY

Copperas Creek

Buffalo Prairie

This map is compiled on 1973 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

ROCK ISLAND COUNTY, ILLINOIS NO. 70



ROCK ISLAND COUNTY, ILLINOIS — SHEET NUMBER 72

72

N

1 Mile

5 000 Feet

Scale 1:15 840

0 ¼ ½ ¾ 1

1 000 2 000 3 000 4 000 5 000

(Joins sheet 63)

(Joins sheet 71)

(Joins sheet 73)

R. 3 W.

T. 16 N.

360 000 FEET

1 705 000 FEET

1 700 000 FEET

345 000 FEET

MERCER COUNTY

Copperas Creek

Mill Creek

Reynolds

28 27 26 25 33 34 35 36

This map is compiled on 1973 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

ROCK ISLAND COUNTY, ILLINOIS NO. 72

ROCK ISLAND COUNTY, ILLINOIS — SHEET NUMBER 73

ROCK ISLAND COUNTY, ILLINOIS NO. 73

This map is compiled on 1973 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

73

N

1 Mile

5 000 Feet

Scale 1:15 840

R. 2 W.

T. 16 N.

365 000 FEET

1 705 000 FEET

380 000 FEET

1 700 000 FEET

(Joins sheet 64)

(Joins sheet 74)

(Joins sheet 72)

MERCER COUNTY

Reynolds

ROCK ISLAND COUNTY, ILLINOIS — SHEET NUMBER 74

74

N

1 Mile

5 000 Feet

Scale 1:15 840

0 1/4 1/2 3/4 1

0 1 000 2 000 3 000 4 000 5 000

8F (Joins sheet 65) 19E3 8E3 8F 280C2 415 R. 2 W. | R. 1 W. 415 400 000 FEET

1 705 000 FEET

1 700 000 FEET

385 000 FEET

(Joins sheet 73)

(Joins sheet 75)

T. 16 N.

MERCER COUNTY

Mud Creek

Mud Creek

26 25 30

27 35 36 31

34

This map is compiled on 1973 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

ROCK ISLAND COUNTY, ILLINOIS NO. 74

ROCK ISLAND COUNTY, ILLINOIS — SHEET NUMBER 75

75

N

1 Mile

5 000 Feet

Scale 1:15 840

0 1 000 2 000 3 000 4 000 5 000

405 000 FEET

1 705 000 FEET

1 700 000 FEET

415 000 FEET

R. 1 W.

T. 16 N.

(Joins sheet 66)

(Joins sheet 74)

(Joins sheet 76)

MERCER COUNTY

29 28 27 26 32 33 34 35

This map is compiled on 1973 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

ROCK ISLAND COUNTY, ILLINOIS NO. 75

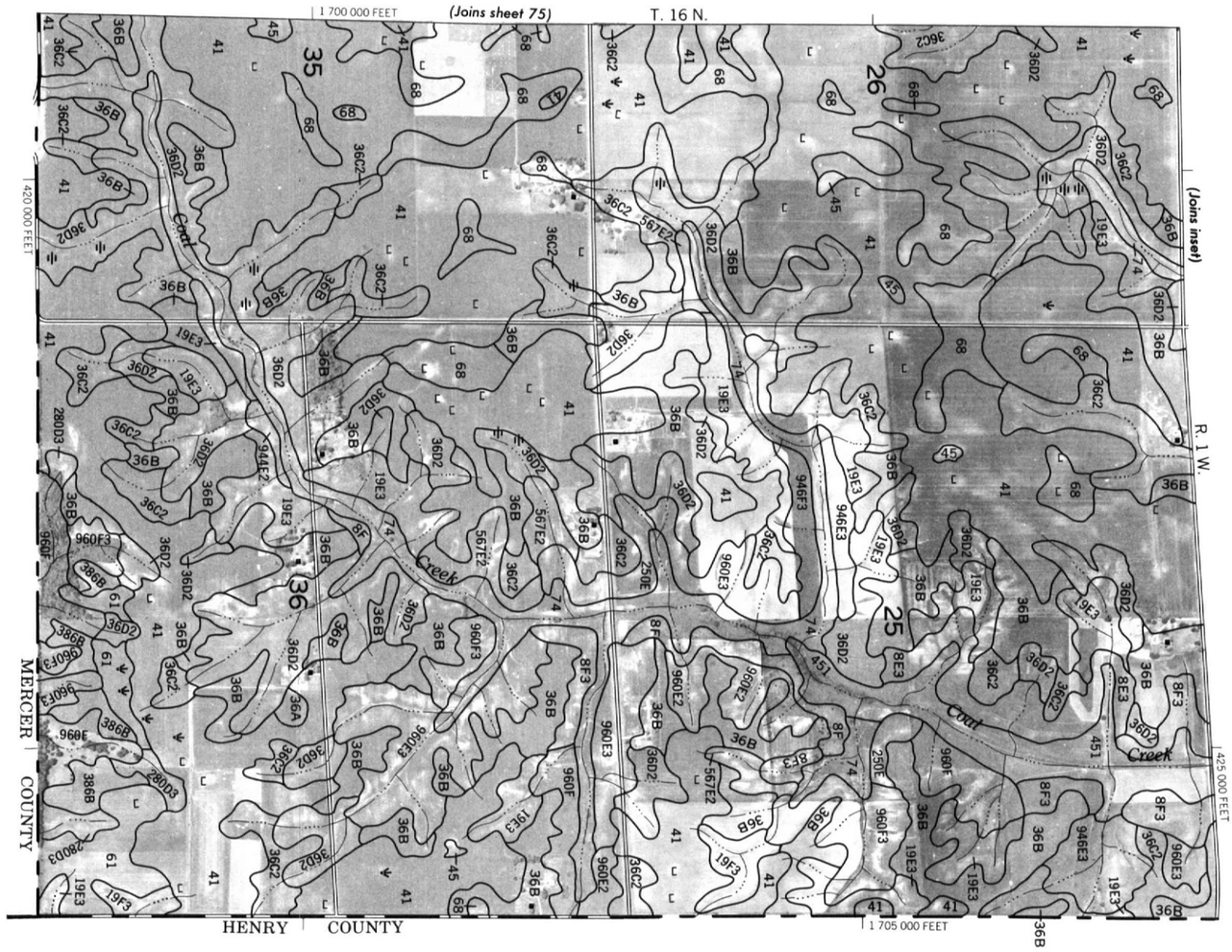
1 ¾ ½ ¼ 0 1 Mile

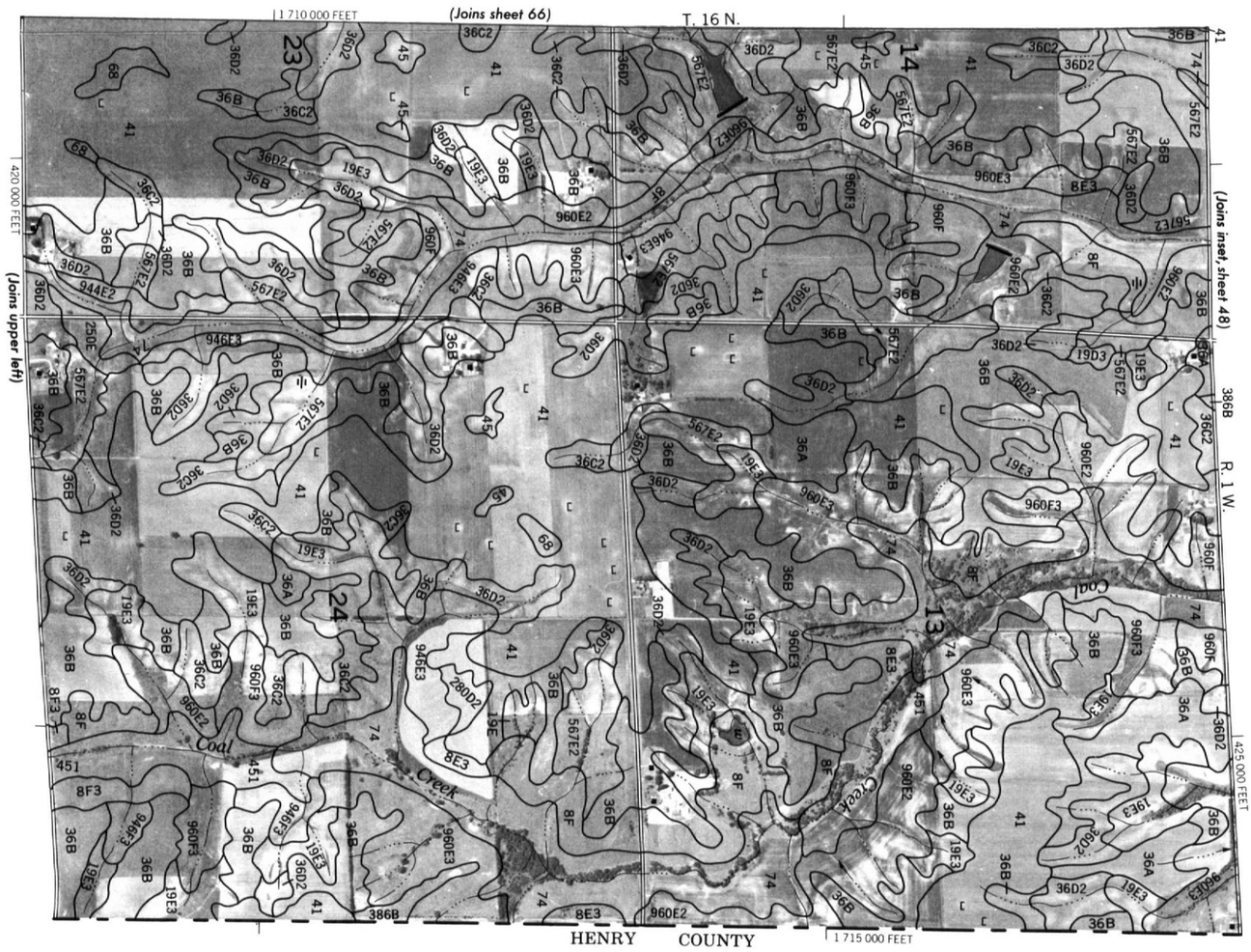
5 000 4 000 3 000 2 000 1 000 0 5 000 Feet

Scale 1:15 840

N

76





This map is compiled on 1973 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.